1987
ANNUAL
REPORT

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

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Annual Report 1987

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Wildlife and Fisheries

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This public document was published at a total cost of $2,350.00. 1,500 copies of this public document were published in this first printing at a cost of $2,350.00. The total cost of all printings of this document including reprints if $2,350.00. This document was published by the Louisiana Department of Wildlife and Fisheries, P. O. Box 15570, Baton Rouge, LA 70895 to service the state agencies in keeping them cognizant of the new rules, regulations and activities under authority of R.S. 49:951-968. This material was printed in accordance with standards for printing by State Agencies established pursuant to R.S. 43:31. Printing of this material was purchased in accordance with the provisions of Title 43 of the Louisiana Revised Statutes.

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A MESSAGE FROM THE SECRETARY

Virginia Van Sickle

The Department of Wildlife and Fisheries herewith submits its 1987 Annual Report to the Governor and the Legislature of the State of Louisiana.

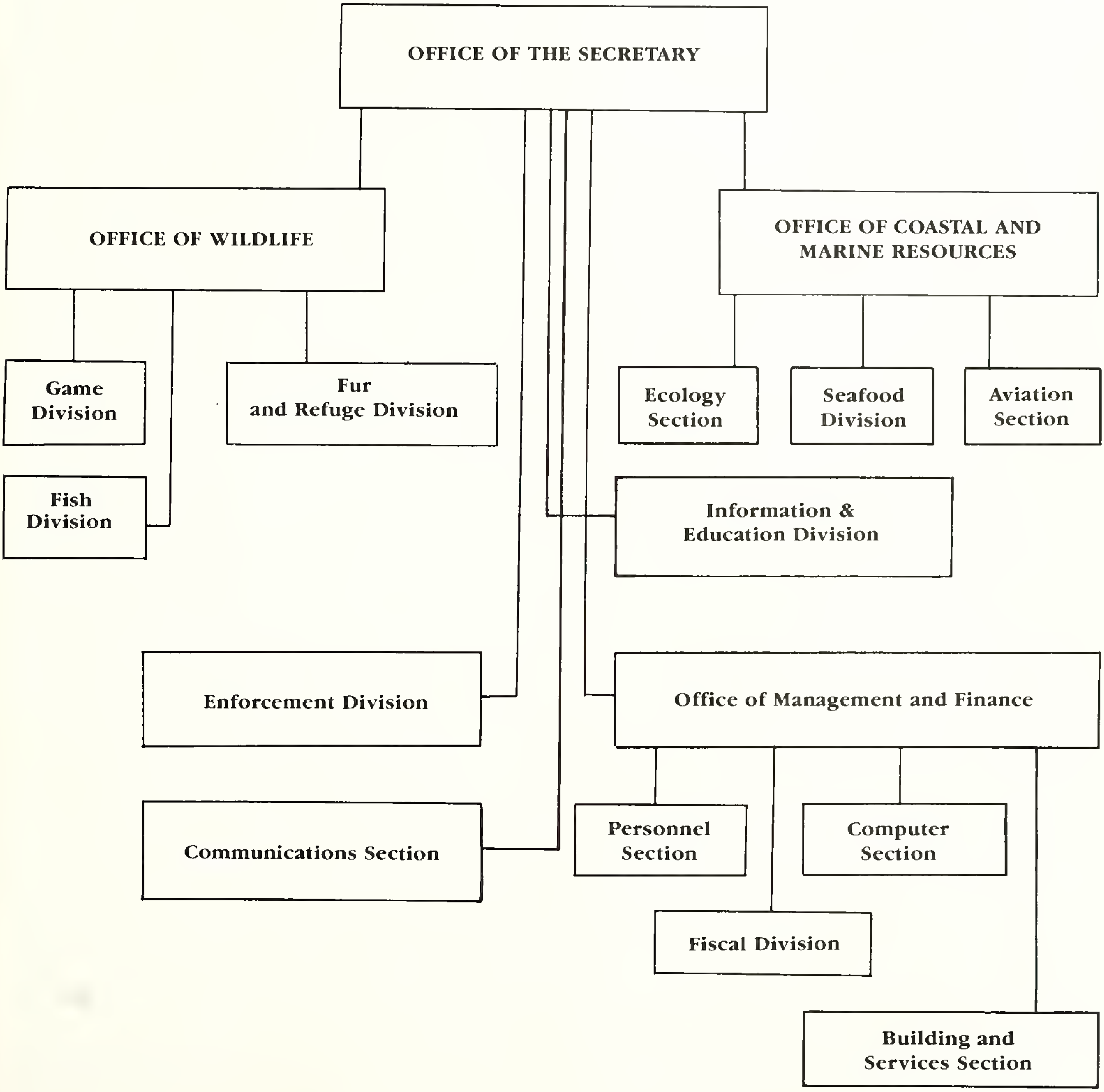
The report covers the many activities conducted by the department in the last fiscal year to enhance, protect, perpetuate and properly harvest our renewable resources.

As an indication of the abundance and diversity of our wildlife, Louisiana leads the nation in harvesting seafood, waterfowl and furbearing animals. The importance of these resources to our economic well-being is incalculable. Their abundance contributes, moreover, to the recreational pursuits available to our citizens.

By aptitude, training and performance, the personnel of our department have compiled a record of leadership in the fields of wildlife management, technical assistance to commerce and industry, conservation, research, law enforcement, education.

Now, as an essentially self-supporting agency, we stand ready in economically straitened times to join the Governor and the Legislature in maintaining the highest standards of service to the public at the lowest possible cost.

ADMINISTRATIVE STRUCTURE CHART



Office of the Secretary

The secretary, as chief administrative officer of the Department of Wildlife and Fisheries, is responsible for all wildlife and fisheries resource management activities in Louisiana. He is also deeply involved in vital conservation matters on both national and international levels.

Administration of the Office of Management and Finance, the Enforcement Division and the Information and Education Division, is directly in the Office of the Secretary, while the administration of the other major divisions, Game, Fish, Fur and Refuge and Seafood Divisions and Aviation and Ecology Sections, is delegated to assistant secretaries.

The secretary is assisted in the administration of the department by a deputy secretary, who is chiefly involved with the management of the various offices and divisions within the Office of the Secretary.

Within the structure of the Office of the Secretary, the Office of Management and Finance, which includes the Fiscal Division and the Personnel, Building and Services, and Computer Sections, is administered by the undersecretary.

Enforcement Division

The Enforcement Division is responsible for enforcing all laws enacted by the Louisiana Legislature relative to wildlife and fisheries resources, applicable portions of the state's Boating Act, and federal regulations pertaining to migratory wildlife and endangered species.

In an effort to further enhance the training of wildlife agents, a committee was formed to review and evaluate current training efforts and make recommendations for improvement of all ranks. It reviewed both the cadet training program and in-service programs.

As of April 1987, Civil Service has upgraded the educational requirements to 60 college hours or two years of equivalent enforcement experience. We feel this will enhance the quality and image of our agents.

All agents again qualified on the P.O.S.T. revolver course, fired a night revolver course and fired a shotgun course with recently issued 12 gauge riot guns. We had two supervisors attending the LSU Law Enforcement Institute. The institute is one of three in the United States and is geared for supervisors or potential future supervisors.

Our Saltwater Enforcement Patrol had another productive year in 1987. With the increase in the presence of large fishing vessels along our coast, our two crafts have worked diligently to insure compliance with state and federal laws in blue water. In addition to their conservation efforts, both vessels have engaged frequently in search and rescue efforts.

This year each of the nine men assigned to SWEP achieved the official Coast Guard status of licensed captain of at least 100 tons. With this achievement came certification in Loran A, CPR, and search and rescue elements.

Meantime, Louisiana's boating safety efforts gained much publicity during the year, and it had a positive effect on safety. The most celebrated of our programs would be the DWI programs organized during the year. Two teams, consisting of five officers each, travel statewide to areas which have shown problems with alcohol and boats. The public has applauded the presence of our DWI teams and has supported efforts to remove drunks from our waterways.

The Covert Operations Section of the Enforcement Division had another busy year in 1987. Concentrating primarily on the illegal commercialization of fish and wildlife, the three-man unit initiated 95 new investigations throughout Louisiana, in addition to ongoing investigations from previous years.

An investigation in March of 1987 led to the smashing of a nationwide smuggling ring dealing in white amur, a weed-eating exotic fish banned in 40 states. Fisheries biologists feel that this fish could destroy the eco-system of our coastal marshes should it reach them.

This is a million-dollar black-market operation originating primarily in Arkansas, and although the investigation is not yet complete, agents say that more than 50 people face state and/or federal charges for buying, selling or transporting the fish into Louisiana.

Our communications staff provides the only 24-hour, toll free public assistance "800" telephone lines in the department. This service now consists of two lines. One line, 1-800-442-2511, is used for reporting game violations under the reward-based "catch a thief" project named Operation Game Thief. The other line, 1-800-325-7067, is used for general information, season rules and regulations, license problems, and to report boating accidents and other emergencies.

It also provides department personnel with access to the boating registration terminal, National Crime Information Center terminal, Lake Pontchartrain Causeway Avoidance Warning System terminal, long range single side band radio communication to the department's large vessels, VHF radio contact with the U.S. Coast Guard, and FM low band radio contact with wildlife agents, aircraft, small boats and outlying camps.

The department's current radio system consists of 38 base stations, 1,020 mobile units, 447 portable units, 141 boats and five aircraft.

Information and Education Division

The Information and Education Division, which reports directly to the secretary, keeps the public informed of department activities and conducts educational programs to promote sound conservation and safety practices.

All sections of the I&E Division worked together during the year to provide increased attention to the safety of Louisiana citizens engaged in recreational pursuits in the outdoors.

To combat the state's disproportionate toll of boating accidents and fatalities, 22 separate boating safety clinics were conducted as a result of which 501 persons were certified as safe boaters.

Meantime, for the third year, the Hunter Safety Section maintained in high gear its Legislature-mandated program to provide safety training for all hunting license applicants born on or after Sept. 1, 1969. The section's 900 volunteer instructors offered a total of 485 firearms safety courses to 21,065 students. Of these, 18,467 gained certification as safe hunters. Fourteen instructor workshops were held and certified 75 new instructors.

In addition, construction of a third shooting range was completed — this one at the department's Bodcau Wildlife Management Area near Minden. Open free to the public, Louisiana's range facilities are regarded as among the finest in the South.

Among other I&E activities in fiscal 1986-87, the division's Education Section presented 1,338 programs designed to acquaint the public with wildlife management and conservation efforts. These programs were attended by 58,561 individuals of all age groups, with emphasis on schoolchildren.

I&E staff members conducted 131 radio and television programs that reached a total audience estimated at 5,824,500. There were 133 boating safety programs presented live to 6,011 people and 133 hunter safety programs presented to 5,709 people.

Division personnel set up 48 wildlife displays at fairs, festivals and conventions in Louisiana which attracted an estimated 419,210 visitors. Besides contributing to these exhibits, the I&E library loaned out 1,493 films and sent 3,669 publications to persons who requested them.

I&E produces and distributes more than 30 different wildlife pamphlets, including hunting and fishing guides, and its bimonthly Louisiana Conservationist magazine is sent free to some 225,000 subscribers.

In 1986-87 the Information Section distributed more than 124 news releases dealing with wildlife and fisheries management, hunting, fishing, trapping, shrimping and oystering seasons, family recreational opportunities, enforcement, environmental improvement and other topics.

In addition, the Information Section provided its clients—both organizations and private citizens—with news features, photographs, radio and TV public service announcements, documentary motion pictures and slide presentations, and other specialized services.

Office of Management and Finance

The Office of Management and Finance is administered by the undersecretary and is instrumental in the implementation of programs and acquisition of equipment by all divisions of the Department of Wildlife and Fisheries. Within this office are the Fiscal Division and the Personnel Section and the Building and Services Section.

Fiscal Division

The Fiscal Division is responsible for all financial requirements of the entire department. This division is composed of the following sections: Fiscal Officer, General Accounting, Federal Aid, Payroll, Purchasing, Property Control, Revenue Operations, License Sales and Motorboat Registration.

Duties of the fiscal officer include preparation of the department's annual budget, all financial statements and annual fiscal reports. This section also maintains records on the department's liability insurance, telecommunications equipment inventory and service, and vehicle operation costs, and coordinates the department's safety program.

The department's annual operating budget expenditures for fiscal year 1986-87 totaled $33,193,100. All disbursements are handled by the Fiscal Division. Revenue recorded by the department for 1986-87 is as follows:

Conservation Fund:		
Royalties	$	4,807,971
Rentals on land		654,171
Other income on land		107,307
Interest income		33,914
Severance taxes		2,394,052
License sales		8,341,859
Miscellaneous		490,108
Rockefeller Refuge Fund:		
Royalties	$	3,418,144
Rentals on land		56,211
Other income on land		23,122
Interest income		126,284
Miscellaneous		22,451

Marsh Island Refuge Fund:		
Royalties	$	313,032
Interest income		300,396
Rentals on land		12,048
Other income on land		70,617
Miscellaneous		197,659
State Wildlife Refuge & Game Preserve Fund:		
Rentals on land	$	316,844
Louisiana Help Our Wildlife:		
Private donations	$	19,201
Interest income		1,354
Wildlife Tax Fund:		
Private sources	$	93,004
Seafood Promotion & Marketing Fund:	$	537,960
Interagency transfers	$	130,997
LOOP	$	171,074
Federal	$	5,434,829
Total Revenue	$	28,074,609

Personnel Section

The new Civil Service reclassification was implemented January 1, 1987. After months of meetings with Civil Service, division chiefs, section heads and employees, all positions have been assigned new job titles. Many individual appeals were processed through Personnel after the initial allocation adjustments.

Job specifications were revised to upgrade minimum qualification requirements and to assure conformance with job duties.

Effective June 29, 1987, the new 32-level pay plan was adopted which replaced the original 64 levels. This compression presented many discrepancies between classes, resulting in many appeals to establish equity.

Personnel Actions had to be generated on each employee for every change in classification and/or GS level.

In November, open enrollment for Health Maintenance Organizations was offered to departmental employees and retirees. Assistance was given in completion of forms and providing information. Group Benefits established new procedures which allow the Baton Rouge and New Orleans service areas only three HMOs each. Those enrolled in unsuccessful HMOs were notified and re-enrolled in another plan within two weeks.

Assistance with personnel-related matters is provided to a wide range of individuals, including job applicants, active employees, retirees, former employees and surviving spouses.

Computer Center

During the year, the Computer Center continued its efforts to assist in moving the department forward. This was achieved by making available additional information for all offices within the department through computerized means via telecommunications.

Additional personal computers were placed in offices throughout the state, enabling the department to perform needed functions using in-house developed software packages as well as vendor software packages. In doing so, a more effective means of reaching the department's goals was accomplished.

Building and Services Section

The Building and Services Section serves the important function of building maintenance for Wildlife and Fisheries offices in Baton Rouge and New Orleans and stocks general office supplies for the entire department.

In addition, it also provides services to departmental personnel including, but not limited to, handling the department interoffice, incoming and outgoing mail; distribution of office supplies statewide; volume copying of books and publication; and printing.

OFFICE OF WILDLIFE

The Office of Wildlife, supervised by one of two assistant secretaries reporting directly to the department secretary, oversees the state's wildlife and fisheries resources. The office comprises three divisions: Fish, Game, and Fur and Refuge.

FISH DIVISION

Louisiana's vast fishery resources are vital to the state's economy from the standpoints of both recreation and commerce. The Fish Division is responsible for managing, protecting, conserving and replenishing those resources, and for controlling undesirable aquatic vegetation that hampers fisheries management, navigation, and fisherman access in Louisiana waterways.

Certain programs of the division that deal with sport fish restoration (research, survey, development and technical assistance) are funded wholly or in part through the Dingell-Johnson federal aid program. Recently, federal legislation was enacted that created the Wallop-Breaux Federal Aid Program. These funds are in addition to the on-going Dingell-Johnson funds and will greatly increase the fish restoration programs in the state. Initial plans for the use of these funds will be construction of fisherman access areas (boat ramps, fishing piers, bank access, etc.), enlargement and improvement of the division hatchery system, and increased staffing to meet the demands of sport and commercial fishing on limited freshwater fisheries resources.

FISHERIES SECTION

The objective of the Fisheries Section is to manage fish populations and habitats for the preservation and improvement of sport and commercial fishing, located primarily in freshwater areas of the state. The Fisheries Section manages five basic sub-programs, including Hatcheries, Research and Survey, Maintenance and Development, Coordination, and Other Services.

HATCHERIES

Striped Bass Program

The striped bass program in Louisiana is designed for the biological control of shad populations in the state's reservoirs and oxbow lakes while providing a highly desirable sport fish. Excellent populations of striped bass/ hybrid striped bass presently occur in many water bodies throughout the state. During 1987, 470,422 striped bass were stocked in Toledo Bend Reservoir, while 15 other lakes throughout the state were stocked with 366,318 hybrid striped bass. An additional 195,407 striped bass fingerlings were stocked in coastal streams.

Flathead Catfish Production

A flathead catfish spawning and reproduction project was initiated several years ago to provide a top predator in public lakes and farm ponds with excessive forage populations of gizzard shad and/or stunted bluegill. This large catfish would also provide an excellent addition to the fishermen's creel. Production and culture of these voracious predators is difficult, and the techniques and methodologies to raise them are still being defined. However, Fish Section biologists are confident that culture techniques will improve to the point where numerous lakes and ponds will be stocked in the future. In 1987, 1,100 flathead catfish fingerlings were produced.

Fish Hatchery Program

There are three state owned fish hatcheries located at Monroe, Forest Hill, and LaCombe comprising 38 acres of production ponds. These hatcheries produced 176,483 northern largemouth bass, 664,918 Florida largemouth bass, 5,072,911 bluegill, 82,120 redear sunfish, 155,000 black crappie, 128,706 striped bass and 78,000 coppernose bream. All fish produced were stocked in the fingerling stage. In addition, the Federal Hatchery in Natchitoches, in cooperation with the Fish Section, produced 225,000 northern and Florida bass, 470,422 striped bass, 366,318 hybrid striped bass, 120,740 channel catfish, and 146,701 blue catfish.

Florida Largemouth Bass Program

Five lakes (Caney Lake, Spring Bayou, Bussey Lake, D Arbonne Lake, and Lake Providence) were stocked with a total of 597,600 Florida largemouth bass fingerlings in 1987. The purpose of this program is to establish trophy-size Florida bass fishing in Louisiana. One of the above lakes, Caney, is also being studied intensively for adaptability and catchability of Florida bass. It is anticipated that in the future, the Fish Section will utilize Florida bass stockings in selected lakes to begin catch-and-release studies in conjunction with lake intensive management programs.

Farm Pond Extension Program

Fisheries biologists provide advice and technical assistance to farm pond owners throughout the state. Fingerling largemouth bass, Florida largemouth bass and bluegill are furnished to pond owners who meet requirements for stocking. In 1987 advice and fish stocking operations were offered to the owners of 1,271 pounds totalling 6,405 surface acres. These pond stockings resulted in providing 224,175 man-days of sport fish recreation for an economic value of $2,578,012.

Southeastern Cooperative Fish Parasite and Disease Study

The primary benefits occurring to the state as a result of this project is the rapid dissemination of current parasite and disease knowledge to state fisheries biologists through annual visits to Louisiana by Auburn University fishery scientists who present slide talks and demonstrate laboratory techniques for isolating and identifying disease organisms. They also provide diagnostic services by coming to Louisiana for direct examination or when preserved species are sent to them for examination. It is anticipated that in 1988 an additional cooperative agreement between the Fish Section and the LSU Veterinary School will enable pond owners to more quickly deal with harmful pathogens in their fish ponds, and for Fish Section biologists to be more intensively trained in identification of fish diseases.

RESEARCH AND SURVEY

Lake Management Program

In 1986 under this program, 30 lakes were sampled with rotenone to determine fish species composition and pounds of fish per acre. From these data, management plans and recommendations for harvest regulations were formulated. Recommendations for lake drawdowns comprised 13,605 acres, increasing potential fishing efforts to 53,876 man-days for an economic value gain of $1,239,143.

A Survey of Factors Affecting Fish Production in the Larto-Saline Area

The primary objective of this project is to define factors affecting fish production in the Larto-Saline area, including water quality, fish population, pesticide levels, and benthos data. This survey will add to the data base of the area and will be valuable in the formulation of management plans to restore better water quality, fish production and recreational value to this important fishery.

Statewide Evaluation of Wire Traps on Game Fish

Some commercial fishermen are striving to have wire traps legalized for capture of commercial fish. Data are presently being analyzed from experimental wire trap sets and final recommendations may allow for better utilization of the commercial fishery or prevent a gear that may be destructive to sport fish from being legalized.

Channel Catfish Investigations in Southeast Louisiana

A problem has existed for years in southeast Louisiana with undersize channel catfish. This project will examine important life history facts of the fish in order to learn what problems exist, if any. Final recommendations may liberalize or restrict size of fish that may be harvested.

L.S.U. Cooperative Fishery Research Unit

Problems arise in fishery management which can often be resolved with a short-term project using limited personnel. The Cooperative Research Unit is partially funded by the Louisiana Department of Wildlife and Fisheries on the premise that specific research needs can be filled by the use of graduate students working under the guidance of a member of the L.S.U. staff. The findings of this unit have proven of great value to many of our management programs. The unit is presently monitoring the invasion, survival, growth and reproduction of grass carp in Louisiana and statewide age and growth studies of catfish. In addition, the unit has been contacted to identify sport fish genetic stocks throughout Louisiana, utilizing state-of-the-art electrophoretic analyses.

Grass Carp (White Amur) Monitoring Program

The Department initiated a study of triploid grass carp in a private lake in Central Louisiana. Unlike the diploid or normal grass carp, the triploid grass carp is supposed to be sterile. This feature would allow fishery biologists to stock grass carp into water bodies with aquatic weed problems without the fear of introducing an exotic fish capable of upsetting the delicate balance of our inland and coastal habitat.

Ten to twelve inch fingerlings averaging one-third pound were stocked into the lake in December 1985. Biologists will sample the fish population, water quality and aquatic vegetation for five years to determine the effect of the grass carp on the lake. Several grass carp will be collected each year to determine their growth rate and sexual condition. Grass carp collected two years after stocking averaged 9 ½ pounds.

Fish Kill Investigations

Fisheries biologists investigate natural fish kills that occur in water bodies to determine the cause of the kill. Reports of the findings are furnished to individuals, groups, public agencies, and news media upon request. Corrective measurements needed to alleviate the kill situation is recommended, although not always possible or feasible to implement. Fish Section biologists also work in conjunction with Environmental Resource Specialists of the Department of Natural Resources when investigating fish kills thought to be caused by industrial pollution. The main function of the fisheries biologist when investigating this type kill is to assess the species and quantity of fishes killed and their monetary values. There were approximately 125 fish kill investigations made in 1987 including both major and minor kills.

Scuba Fishing For Gamefish

Toledo Bend Reservoir is currently the only Louisiana freshwater lake where gamefish may be taken by scuba divers. For the third consecutive year, this season, running from June 1 through September 30, was opened experimentally on the Louisiana portion of the reservoir below the Pendleton Bridge. This season is being monitored by three approaches: 1) Monthly reports submitted by scuba divers to the Department as a condition of receiving an annual scuba fishing permit, 2) Roving creel censuses for purposes of personal interviews with scuba fishermen, and 3) Scuba spearfishing efforts done one week per month in each season by two Department divers for purposes of comparing harvests with catch reported by permitted divers.

Survey of Paddlefish Stocks in Louisiana

Paddlefish (spoonbill catfish) in Louisiana have come under increasing harvest pressure in recent years, primarily because paddlefish eggs have become an acceptable alternate caviar source for Iranian sturgeon caviar. The paddlefish also provides a valuable sport snagging fishery in large river lock and dam structures. This project was undertaken to provide the Department with baseline biological data on this previously unstudied fish. Obtaining such data as growth rates, age at maturity, net susceptibility, and relative abundance should enable the Department to better manage its paddlefish stocks.

Aquatic Vegetation Investigation for Sportfish Management

This research project involves the study, management, and control of noxious aquatic vegetation in lakes for the overall enhancement of fisheries. The project also involves the updating and preparation of new contour maps and lake guides for sportsmen and management biologists.

Caney Lake Investigations

Caney Lake, a recently completed and inundated 5,000 acre lake near Chatham, Louisiana, offers the Department a unique opportunity to study the biology of the Florida largemouth bass. A large number of Florida bass were stocked in this impoundment in the past two years. The presence of some native largemouth bass offers an opportunity to study the adaptability and catchability of Florida bass vs. native bass. Study approaches include creel census work, rotenone sets, age and growth, food habits, reproductive development and identification through meristic counts and electrophoresis.

MAINTENANCE AND DEVELOPMENT

Public Access and Boating Facilities

This project is designed to construct, acquire, develop, renovate and/or maintain additional or improved access of public waters for boating as part of the state's effort for the restoration, management and public use of sport fish.

Construction of a Water Control Structure for Turbidity Control and Fish Population Control

The objective of this project was to build a water control structure that will introduce good quality water into the Larto-Saline Complex and thus prevent the influxes of Red River Water. Work was completed in 1986, with a high water influx causing some structural damage. After the problem was corrected in 1987, the control structure is functioning properly. Fishing is expected to improve dramatically due to this project.

Boat Ramp Maintenance and Construction

The Fish Division is responsible for inspection and maintenance of forty-one (41) Department boat ramps located throughout the state, which are used free of charge by the general public. In addition, three (3) ramps were recently completed, and construction was initiated on nine (9) others.

Maintenance and Upkeep of 14 Lakes Resulting From Act 858 of the Louisiana Legislature

Act 858 of the 1981 legislature dissolved the local state lake commissions of 14 lakes and placed the responsibility to maintain and upkeep said lakes directly under the Louisiana Department of Wildlife and Fisheries. These lakes include Anacoco Lake, Vernon Lake, Bundick Lake, Clear Lake, Smithport Lake, Cocodrie Lake, Lake St. Martin, Spanish Lake, Larto Lake, Corney Lake, Turkey Creek Lake, Hardwater Lake, Beauregard-Old River, and West Atchafalaya Floodway.

COORDINATION

Fish Management Coordination

This project administers, coordinates and supervises all federal aid fisheries projects (research, management, development) in the Fish Division. Administration of the newly created Wallop-Breaux funding will also be a future function of this project.

Dingell-Johnson Fish Restoration Expansion

Recently, federal legislation was enacted that created the Wallop-Breaux Federal Aid Program. These funds are in addition to the on-going Dingell-Johnson funds and will greatly increase the fish restoration programs in the state. At this time it is not certain the amount of monies that will become available through this program during the next fiscal year. In order to qualify for maximum funding the state will have to match the federal monies (75%) with state funding (25%). This federal legislation mandated how the monies would be used within the states with a goodly portion going into providing fishermen access. Initial plans for the use of these funds will be construction of fishermen access areas (boat ramps, fishing piers, bank access, etc.) and enlargement and improvement of the division's hatchery system.

OTHER SERVICES

Catfish Farming Extension Service

This service is provided to non-commercial catfish farmers whereby essential advice and technical assistance is furnished in regards to stocking rates, proper pond construction, water quality maintenance, nutritional requirements and methods of feeding, harvesting and handling procedures; and the very important service of identification and treatment of catfish parasites and diseases that are a constant threat to the catfish crop. In 1987, our assistance contributed directly to the production of an average of 1,500 pounds per acre in approximately 2,500 acres of catfish ponds, with a wholesale value of approximately $3,750,000.

AQUATIC PLANT RESEARCH AND CONTROL SECTION

This Section conducts research on troublesome aquatic plants in Louisiana waters, provides technical information on control methods, and supervises and conducts a statewide program of spraying waterhyacinths on public waters in Louisiana.

Waterhyacinth Control Program

During the fiscal year 1986/87, the aquatic weed control program provided substantial benefits to millions of Louisianians. Section crews, utilizing boats, airboats, mudboats and roadside spray units, effectively applied herbicide to 24,968 acres of Louisiana's freshwater wetlands infested with waterhyacinths. Another 3,347 acres were treated by helicopter for a total of 28,315 acres.

Special Control Projects

During the year, limited applications of specialized herbicides were used to relieve unusual and severe infestations of aquatic weeds in False River, Bayou St. John, Bayou DeSiard, and other areas. These applications were temporary measures and served to familiarize local residents with safe and effective use of aquatic herbicides.

Research Programs

Ongoing research projects of the Aquatic Plant Research and Control Section include:

Evaluation of new herbicides to determine their availability and effectiveness for use in aquatic weed control.

Continued investigations into the effects of environmental conditions and water fluctuations on hydrilla, as well as evaluations of chemical, biological and mechanical methods of its control.

Lake Management Project

An important part of the stewardship of Louisiana's wildlife and fisheries resources is the skilled and professional management of the state's public lakes. Aquatic vegetation investigations were made by section personnel to determine plant species composition and density on 29 lakes. The primary objective of this work was to obtain accurate records of aquatic weed infestations in these lakes which is necessary for the proper formulation of workable management plans. As a result of these investigations, management recommendations were made for 8 lakes, 4 of which underwent drawdown procedures.

Noxious Plant Monitoring Program

An ongoing part of the section's responsibilities is the identification and monitoring of noxious non-native aquatic plant populations invading Louisiana's extensive wetlands. During 1987 twenty-four lakes were type-mapped by Section personnel to determine and evaluate the encroachment of these plant species. In cooperation with personnel of the U. S. Army Corps of Engineers, a close watch is kept on the density, environmental impact and rate of spread of these introductions. A notable example is hydrilla, a submersed aquatic plant that was discovered in Louisiana in 1973 and is now spreading into many areas of the state with the potential of becoming a more serious pest than the waterhyacinth. Another more recent introduction, but also potentially quite troublesome species is salvinia. This relative new-comer to the state has begun making its appearance in several areas of South Louisiana and is being monitored very closely.

Technical Assistance Program

Section biologists provide advice and technical assistance to private pond owners and municipalities concerning aquatic vegetation management problems. In addition to offering professional recommendations for the establishment of proper management programs through this popular extension program, biologists also provide aquatic plant species identification assistance for the inquiring public on request.

Other Projects

Section personnel are presently undertaking a project to map and contour all major lakes built in the state since 1972, as well as updating earlier maps on several additional lakes as needed. These maps should provide valuable information to sportsmen and lake managers alike.

Plans are also being developed for the publishing of a full-color pictorial guide to the aquatic plant species of Louisiana. Field personnel are presently collecting photographs throughout the state for inclusion in this booklet. Both public awareness and interest in our aquatic ecosystems should be heightened by this informative publication.

Game Division

Land Acquisition

Over the past 27 years, 332,866 acres of property have been purchased by the Department and dedicated to wildlife and the outdoor public recreation it affords.

In 1987, the state's fiscal problems resulted in this Division curtailing its aggressive land acquisition program. A small inholding was purchased to increase the size of Sandy Hollow Quail Research and Development Area to 3,397 acres. Many excellent tracts of wildlife-land are available for purchase at reasonable prices but monies are not available. Future plans for land acquisition include a means to provide a stable funding source for this crucial aspect of the Department's wildlife management program. It is important that land acquisition maintain a high priority to protect and conserve the remaining wildlife habitat of the state.

Forestry Section

Timber sale activities were carried out this year on Pearl River. Pomme de Terre, Russell Sage, Sandy Hollow, and Spring Bayou WMA's. Additional forest management activities geared toward improving wildlife habitat, including regeneration cuttings and TSI work, were accomplished by Department personnel on Ouachita, Red River, and Sandy Hollow WMA's.

Reforestation activities continued on Ouachita and Pomme de Terre WMA's; desirable bottomland hardwoods were planted. Supplemental oak plantings were carried out on Pearl River and Russell Sage WMA's in logged-over areas. Acorns collected statewide by Department personnel were utilized for direct seeding in these projects and for seedling stock grown at the Columbia Nursery.

The annual mast survey was compiled from district surveys of WMA's mast abundance. The Fall's mast crop was relatively poor throughout the state due to a late spring freeze and long summer drought.

Cooperative work with the USDA Forest Service continued with over 54 Ranger District compartment prescriptions and amendments reviewed. Additionally, various meetings were attended, including the Southern Evaluation Project Workshop in Long Beach, MS.

A slide program depicting the Department's forest management activities and objectives was developed and presented to various groups, including the 8 district crews, Avoyelles Parish School Board, Southwest Chapter LASAF, and several schools. The program pictorially describes the objectives of LDWF's wildlife/forest management programs.

Department foresters cooperated in the development of Best Management Practices (BMP's) for Louisiana Forests through participation in the Louisiana Forestry Association's Wildlife Committee. Development of BMP's will provide forest landowners with a practical forest management guide for their timberlands.

This section served on the Lowland Hardwood Subcommittee of the Southeastern Association of Fish and Wildlife Agencies, which met in New Orleans. As a result of this meeting, a plan was developed which would compile related forest management information to be disseminated to public managers of lowland hardwood and related forest areas in the region.

Other committees served by the Forestry Section included the FAC Land Use Fish and Wildlife Sub-Committee and the LFA Wildlife Management Tour Committee. Forest Awareness Week was activated through participation with USDA Forest Service, LA Office of Forestry, LA Cooperative Extension Service, and Forest Industry personnel as area schools participated in an information field tour through Kisatchie lands in the Kincaid Lake area near Alexandria.

Examination of private and industrial timberland holdings was accomplished with District personnel, resulting in recommendations for wildlife and timber management on these lands to improve the wildlife habitats.

A review of the section's timber harvests on the WMA's was done by Mr. Robert Johnson of the USDA Forest Service Hardwood Silviculture Laboratory. Favorable responses, critiques and recommendations were received and will be utilized to further a comprehensive and beneficial wildlife/forestry management program on our WMA's.

Research Section

The Research Section gathers data on game birds and animals, largely for use in formulating hunting regulations. Separate programs monitor the population status of dove, deer, waterfowl, turkey and upland game birds. Hunters are surveyed by mail as a means of estimating the annual harvest of various game animals and birds.

Doves

Maintaining the mourning dove population in a healthy productive state is a primary management goal designed to provide recreational opportunities for both the hunting and non-hunting public. The management program for doves includes population and harvest surveys which are necessary to provide information for properly regulating the harvest.

The dove breeding population is monitored by a call-count survey conducted in late May throughout the Continental United States along about 1,000 routes. Each route is located on lightly traveled roads and has 20 listening stations spaced at one-mile intervals. At each stop, a wildlife biologist records the number of doves heard calling. The counts begin one-half hour before sunrise and continue for two hours. This count provides an index to the dove breeding population and indicates whether the population is increasing, decreasing, or remaining stable from year to year.

Louisiana's dove population is monitored along 19 routes randomly located throughout the state. In May 1987, an average of approximately 14 doves per route were recorded calling as compared to 10 doves heard per route in 1986, indicating an increase in the breeding population.

Dove hunting regulations for 1987 were again set at 70 days with a bag limit of 12 birds. Shooting hours for the 1987 season remained unchanged from 1986 allowing all-day hunting, except on opening weekend of each season segment when hunting was restricted to afternoons only. This set of hunting regulations seemed to satisfy most Louisiana dove hunters.

Deer

Biological data essential to the state's deer program were compiled at Wildlife Management Areas during managed hunts open to the public. At 23 major deer areas, biologists at daily check stations obtained research and management data from 2,739 deer kills made by 44,566 hunters.

Veterinary health surveys were conducted in 6 herd areas one each in Claiborne, Evangeline and Richland Parishes and three in East Feliciana Parish. In-depth studies focused on the deer herd of Claiborne Parish. These surveys were made in conjunction with the Southeastern Cooperative Wildlife Disease Study.

Other deer work in 1987 included deer range and populations surveys with management guidance provided on 691 club land areas (units) participating in the state's Intensive Deer Management Unit Program. This is a 436 percent increase in participation since its beginning in 1981. Many poor quality deer herds are being improved through sound scientific management on more than 1,530,000 acres currently enrolled in the program while recreational values are soaring.

Waterfowl

Louisiana has approximately 4 million acres of coastal marsh that winter large and diverse waterfowl populations. Seven aerial waterfowl inventories of the entire coastal marsh are conducted each winter. Additional surveys are conducted in north central and northeast Louisiana. It is estimated that 5 million waterfowl migrate down the Central and Mississippi Flyways to winter in Louisiana. The mid-winter inventory indicated 4 million waterfowl in the coastal marsh and inland areas of the Mississippi Delta during January of 1988.

Louisiana is associated with the Mississippi Flyway for hunting regulation purposes. The 1987-88 season was the third year the entire Flyway had more restrictive hunting regulations than during the previous 10 years. Preliminary harvest information indicates that the season was successful and an increase in harvest is expected compared to the 1986-87 season.

In the 1986-87 season, 105,000 hunters bagged 1.2 million ducks. These figures represent a 1 percent increase in the number of hunters, with the total duck harvest basically unchanged from the previous year. Species composition was blue-winged teal (23%), mallard (17%), gadwall (14%), green-winged teal (15%), wood duck (9%), with pintail, shoveler, wigeon, mottled duck and divers forming the remainder (22%). Additionally, approximately 52,000 geese were harvested during the 1986-87 season. White-fronted geese comprised 63 percent of the harvest while blue-and snow-geese accounted for the remainder.

Beginning with the September Teal Season, waterfowl hunters in twenty four parishes were prohibited by federal regulations from using shotgun shells containing lead pellets. Those parishes, comprising the entire coastal marsh and other popular waterfowling areas throughout the state, represent the state's most heavily hunted waterfowl areas and account for about 86 percent of Louisiana's annual waterfowl harvest.

The conversion schedule is based on the annual waterfowl harvest in each parish as determined by U.S. Fish and Wildlife Service wing receipts for the ten-year period spanning 1971-80. Those parishes converting this year have had a harvest rate of 20 or more waterfowl per square mile. The remaining parishes in the state will be phased in through 1981 when the entire state and country will be required to use steel shot exclusively for waterfowl hunting.

Wild Turkey

In 1987 the primary emphasis of the turkey section was again centered around restocking programs in Northwest Louisiana. Efforts were directed toward restoring wild turkey population in those areas where past releases had met with little success. A total of 135 turkeys were captured throughout the state and relocated to portions of Bossier, Caddo, Claiborne and Webster Parishes. Twenty-three additional birds were obtained from Missouri as part of an otter-turkey exchange negotiated by the Louisiana Wild Turkey Federation (LWTF). These birds were released on sites in eastern Claiborne Parish chosen by the Department and the LWTF.

Results from the 1986 Big Game Harvest Survey indicated that 16,000 hunters harvested 6,100 gobblers. Louisiana sportsmen spent 122,000 days afield pursuing one of the fastest growing sports in the state. This increased demand will require a concerted effort by this Department to restore wild turkey populations in the remaining habitat and to make available more public lands for pursuit of the wild turkey.

Quail

Two population surveys were conducted this past year: the wing survey and the fall whistling survey. Hunters participating in the annual wing survey supplied 1,149 wings to be aged. Sex and age ratios were determined. Statewide fall whistling counts were conducted. Inferences about population conditions were developed based on the combined results of these two survey techniques and general observations made by department personnel during the breeding season.

A statewide bobwhite disease investigation was continued in 1987. Necropsy and pathology analyses of birds by the LSU School of Veterinary Medicine revealed no significant diseases or parasites.

A Louisiana Tech study evaluating wildlife utilization of plantings versus fallow discing was initiated in 1987 on National Forest lands with section personnel performing most of the field data collection. In addition, the four-part research project on bobwhite habitat management initiated by section personnel in the summer of 1986 was continued as was the Southeastern/Louisiana State Universities cooperative study on LDWF lands. Results of these studies should provide valuable information concerning practical management of pinelands for bobwhites in Louisiana.

Pheasant and Black Francolin

During the spring of 1987, a night-lighting pheasant-capture technique was briefly attempted. Although no birds were taken, this technique appears to offer potential.

Spring cock pheasant crowing counts were conducted on the Lake Arthur and Sulphur area sites. The Lake Arthur count remained very low while the Sulphur route count was 33 percent above its 1986 value.

Spring call counts of Black Francolins were conducted along 2 survey routes in the Gum Cove area of Cameron and Calcasieu Parishes. The Black Francolin, a non native game bird. was last introduced into the area during the late 1960's and a small remnant population remains. Only one Black Francolin was recorded during 6 surveys in 1987.

Woodcock

A statewide investigation was initiated to address the reproductive condition (i.e., follicle and testis size) of woodcock during the hunting season. Data was obtained from a total of 105 woodcock collected by Department personnel and volunteers during the 1986-87 hunting season.

Upland Game Section

Nongame

The Nongame Wildlife Program (NWP) was officially established in late September 1987 with the staffing of 1 full-time nongame biologist. Nongame activities, however, were initiated prior to September. Foremost among these was the start of a 2-year study to document the seasonal relative abundance of nongame birds on Sandy Hollow WMA. A bluebird nesting box project was also initiated.

The NWP's post-September activities included an agreement with the National Wildlife Federation to cosponsor a southeast regional symposium on research and management of raptors. Initial actions were taken toward the production of bird checklists for WMAs and a booklet on Louisiana hummingbirds, and 3 nongame articles were written for publication in the Louisiana Conservationist. The NWP staff of 1 also responded, through correspondence or field travel, to numerous public requests for information regarding nongame wildlife. NWP staff also represented the Department by attending the Third Southeast Nongame and Endangered Species Symposium held in September in Georgia.

Acres for Wildlife

Some 340 cooperators (which included over 100 hunting clubs with large memberships) with lands totalling more than 300,000 acres were enrolled in the "Acres for Wildlife" program in 1987. Program biologists inspected land, prepared management plans and bulletins, and made presentations to various groups.

Upland Development

Upland game development work on WMAs and private land open to the public by Cooperative Management Agreements continued during 1987. Food plots totalling almost 1,000 acres were planted by section and district personnel. An additional 10,000+ acres were bushhogged, disced or control burned by Department personnel.

Oaks for Wildlife

Hardwood species available to the public through the "Oaks for Wildlife" program were predominately water oak. A total of 2,313 seedlings were available for distribution, and unclaimed seedlings were utilized by the department on wildlife management areas.

Development Section

Wildlife Management Areas

The primary function of the Development Section is to establish, develop, manage, and maintain wildlife management areas (WMAs). The management area concept is one of the most successful programs of this Department. At the present time the Game Division operates 35 of the state's 39 wildlife management areas. Within all 39 wildlife management areas there are over 1,107,402 acres, of which the Department owns in excess of 332,866 acres.

All areas within the WMA system provide over 1,000,000 recreational man-days each year. This use is in the form of hunting, fishing, boating, picnicking, camping, crawfishing, trapping, field trials, bird watching horseback riding, hiking, sightseeing, and other related outdoor activities. In the fall of 1987 a new area, Ben's Creek in Washington Parish, was leased from Cavenham Forest Industries, Inc. These 13,856 acres were added to the WMA system. This management area will play an important role in providing lands in that part of the state for public outdoor recreation.

Expenditures of time and money are necessary to maintain roads, camping areas, boundaries, bridges, water control structures and other Department owned facilities. Road construction on new state owned areas and road maintenance on all areas play a significant role in providing access for the public to enjoy the various forms of outdoor recreation.

In cooperation with Ducks Unlimited two important waterfowl development projects were started in the fall of 1987. The Ouachita Wildlife Management Area is nearing completion. This project consists of a 1,500 acre waterfowl refuge, while approximately 4,000 acres are being developed for waterfowl hunting. A series of levees were constructed and two high volume lift pumps were installed. An observation tower is in the process of being constructed. The Pomme de Terre project is progressing as weather permits and should be completed and in operation by the fall of 1988. Ducks Unlimited provided funding for these projects through the MARSH Program.

The importance of WMA's in furnishing a place for the public to enjoy the out-of-doors is rapidly increasing as more private holdings are being leased to hunting clubs. Within the last few years many large timber companies have leased vast acreages to hunting clubs. As long as timber companies can derive revenue from this endeavor this trend will continue and will result in an increase of participation on Department operated WMA's.

District Activities

For wildlife management and administrative purposes, the state is divided into eight districts each with a district office, wildlife supervisor, biologists and secretarial staff. Wildlife specialists are assigned to work specific Management Areas and to also assist with other projects throughout the district.

On-going district activities include conducting deer range surveys and gathering biological data on other game species. This information is used to develop recommendations that are presented to the Commission for the setting of annual hunting seasons. Other routine activities include working on the wildlife management areas, conducting managed hunting and trapping seasons, checking hunter success and improving wildlife habitat.

Food and cover is improved by burning in the pine uplands, planting food plots and closely regulating logging activity on state owned areas.

Considerable time is spent in the winter trapping and releasing turkey on suitable sites across the state. During the winter, several districts are heavily involved in trapping and banding waterfowl. Assistance is provided to other divisions, on an as-needed basis, in fur and fish related management or research activities. The districts play a valuable part in providing technical assistance to many landowners interested in providing or improving wildlife habitat on their property. Increased interest in Intensive Deer Management also caused increases in time and man-power devoted to this popular program by the Game Division. Preparing annual reports, updating long-range wildlife management plans and budgeting requires considerable time of the District Supervisor and his staff of biologists.

The District Supervisor of the Game Division, in addition to biological work, is also charged with the entire responsibility for managing the district office. This includes all grounds and building maintenance as well as janitorial work and repairs. A rapidly increasing work load is undertaken by district secretaries who also provide assistance to the Fish, Fur and Refuge, and I & E Divisions. Smooth coordination of public information and assistance is often the responsibility of these employees.

The activities of all districts and their staff within the Game Division are coordinated on the state level to provide for better management of the state's wildlife resources.

District I

Wildlife Management Areas in District I contain just over 68,000 acres on 4 areas. This public land provides recreational opportunities for outdoor enthusiasts in Northwest Louisiana and attracts sportsmen from surrounding areas.

Wildlife habitat manipulation is an integral part of management on these areas. During 1987, 2,100 acres of timberland were prescribed burned. Burning of this nature provides beneficial results for a wide variety of game and nongame species. Planting of food plots, another type of habitat manipulation, was also continued. Eighty-five acres of food plots and 55 additional acres of winter wheat were planted and fertilized to provide food and cover and to increase edge-effect. Many more acres were chopped, disced or bushhogged.

District-wide activities in 1987 include meeting with 300 participants enrolled in the Intensive Deer Management Program, as well as the successful release of 97 wild turkeys throughout the district. Personnel also provided technical assistance to the Army Ammunition Plant and Barksdale Air Force Base regarding wildlife management.

District II

Hardwood seedlings were planted on 668 acres of reclaimed farmland on the Ouachita WMA. Also on Ouachita WMA construction was initiated on a 1,700-acre waterfowl management project with partial funding from Ducks Unlimited. Approximately 400 acres of timber on Russell Sage WMA was marked to be thinned for wildlife habitat improvement. Managed public hunts for species such as deer, squirrel, rabbit, waterfowl and raccoon were conducted on Georgia Pacific, Union, Ouachita and Russell Sage WMAs. Road repairs, boundary marking, food plot planting, law enforcement and maintenance activities were performed on each WMA.

District biologists cooperated with more than 100 hunting clubs and landowners through the Intensive Deer Management Unit Program. Additional advice was provided to landowners concerning timber, upland game, waterfowl and turkey management. More than 1000 ducks were banded during trapping operations on Coulee Refuge. Turkey trapping was conducted on Ouachita WMA. Programs were presented to sporting, civic and governmental organizations. A national hunting and fishing day observance was held at the District Headquarters which was attended by 1,600 people.

District III

Normal district activities including managed hunts, turkey trapping, answering inquiries from the public, and management area custodial duties were carried out as usual. In addition a number of illegally captive deer were confiscated by district personnel. Assistance to the upland game section was provided by district personnel by running a number of quail census routes. District personnel also cooperated with the forestry section in reviewing USFS management prescriptions. The newest activity in District III was the start of wildlife food plot planting on the Alexandria State Forest WMA. This was possible due to a new informal agreement with the State Office of Forestry personnel.

District IV

District IV, located in north central Louisiana, is comprised of 7 parish and 6 wildlife management areas owned by the Department and managed for public use. These areas total approximately 178,000 acres. District IV is very popular with the state's sportsmen and provides many man-days of recreational opportunities, which adds to the local economy.

Managed deer hunts conducted on 4 WMAs resulted in a harvest of 1,110 deer by 11,072 hunters. An average of 10 hunter efforts per deer exceeds the statewide success rate. Boeuf WMA was scheduled to have a managed hunt but it was cancelled by a court order.

District-wide activities include aerial waterfowl inventories on the 30,000 acre Catahoula Lake, providing technical information for 78 hunting clubs enrolled in the Intensive Deer Management program and turkey trapping and restocking programs.

District V

District V Game Division activities ranged from the management of hunting seasons across the district to answer nuisance animal complaints (especially in regard to alligators). This district provided technical assistance to hunting clubs and private individuals regarding the maintenance and development of wildlife species and habitats. Other district activities included the trapping and relocation of wild turkey, conducting waterfowl and furbearer censuses, conducting deer range surveys, stocking pheasant and conducting population censuses, and managing hunter check-stations. Information and technical assistance was provided to civic and hunting groups. District personnel maintained roads, boundaries, and food plots and monitored oil and gas exploration activities on WMA areas.

District VI

Wildlife Management Areas in District VI continue to provide many man-days of recreation on the 92,000 acres available for public use. An estimated 130,000 recreational man-days were monitored on the six WMAs. Deer hunters harvested approximately 750 deer while the squirrel season produced an average harvest. Waterfowl hunters met with good success with teal, mallard and wood duck being the major species harvested.

During 1987, a second year of cooperation between the U. S. Fish and Wildlife Service and this Department on Atchafalaya NWR resulted in a negotiated farming agreement to leave grain in the field for wildlife. Winter food plots were planted and a levee impoundment for waterfowl was completed as a result of this unique venture.

District-wide activities involved 83 hunting clubs in the Intensive Deer Management Program. This allowed for the additional harvest of 942 antlerless deer on these clublands. Private as well as public lands were assessed for alligator habitat with 294 alligator tags issued on over 100.000 acres. Success rates for alligator hunters were in excess of 92%.

On-going district activities include supervision of timber cuttings, hardwood mast production surveys and coordination of wildlife research projects conducted by State Universities.

District VII

This was a year of growth for District VII. A new management area, Ben's Creek WMA, was established through the cooperation of Cavenham Forest Industries, Inc. This 13,856 acre area in Washington Parish will provide recreational opportunities for deer, upland bird, and rabbit hunting. An additional 5,406 acres was leased from The Nature Conservancy and added to the Pearl River WMA. This area is now 40,302 acres in size and is one of the heaviest used areas in the state. A new boat storage facility and work area was constructed at Manchac WMA.

In addition to the development, enforcement and management work on the district's WMAs, personnel were involved with the Intensive Deer Management Program (125 cooperators), alligator survey and harvest program, turkey restoration program, state fur animal census, Oaks for Wildlife Program, Ouachita WMA tree planting project, Game Breeders Program, along with other district and Department projects.

District VIII

District VIII encompasses the southeast portion of the state. Three wildlife management areas with approximately 95,000 acres provide hunters and fishermen with public lands to pursue various outdoor activities.

Waterfowl season on Biloxi WMA proved to be good with teal and gadwall being the predominant species harvested. Excellent catches of shrimp, crabs and other saltwater species were noted on Bohemia WMA. Managed deer hunts on Bohemia WMA resulted in 35 deer being harvested by 1,227 participants. Squirrel and rabbit harvests were noted to be above average.

District-wide activities included meeting with 81 cooperators enrolled in the Intensive Deer Management Program. These clubs were advised on deer management techniques and 620 antlerless tags were issued as a result. Habitat assessment for alligator was also conducted with 1,689 commercial tags and 191 nuisance tags being issued on 505,294 acres of alligator habitat.

Heavy Equipment Section

Road repairs and maintenance work were performed on 17 wildlife management areas.

On the Bodcau WMA, preliminary dirt work was conducted to prepare a site for the sheds at the shooting range. Also on this area the four-and-three-eighths-mile road started in 1986 was completed.

At the Manchac WMA personnel excavated and drove pilings for the boathouse constructed by the Maintenance Section. After the boat house was completed a parking area and boat launch were established.

On the Ouachita WMA section personnel continued levee and road work for the waterfowl development project.

A weir on Saline WMA was breached in 1987. Personnel reconstructed this water control structure to ensure management of the fishing resource on the area.

Maintenance Section

This section accomplished building maintenance, renovation, and construction at Department owned installations throughout the state. A shooting range was started on the Bodcau Wildlife Management Area and was near completion in December 1987. This complex consisted of a 50-yard pistol range, a 200-yard rifle range, and a trap range. The 50-yard firing line for the pistol range and the firing line for the rifle range had a concrete slab 10′ × 100′ with a shed constructed. A 20′ × 20′ pavilion was also constructed.

At the Manchac Wildlife Management Area a five-stall boat house was constructed with funding from Southeastern Louisiana University.

The section removed part of the old Quail Hatchery Building at the Baton Rouge office to make room for a new storage facility.

Animal Control Section

The Nuisance Animal Control Section is composed of five Wildlife Specialist Trappers and one Biologist. The goal of the section is to train individuals with nuisance problems in various trapping techniques or methods of habitat alterations to mitigate their losses. In addition to training individual landowners several trapping clinics were held in cooperation with police juries and other municipalities to train their employees in trapping techniques.

Section trappers removed 157 coyotes, 179 beavers, 35 foxes, 38 nutria, 17 raccoons, 17 opossums, 16 skunks, 11 bobcats, and 2 squirrels while working 231 complaints statewide. In addition, the Secretary of the Department issued 149 permits to landowners to control nuisance animals on their lands.

FUR AND REFUGE DIVISION

The activities of the Fur and Refuge Division can be divided into four major categories: managing land which the Department owns or leases; research into new and improved management practices for the State's fur, alligator and other wildlife resources; direct land management and supervision of the State's fur and alligator resources; administration of the Louisiana Natural Heritage Program.

LAND MANAGEMENT

The Fur and Refuge Division is responsible for the management, improvement, and protection of five refuges and four wildlife management areas. With the exception of Coulee Wildlife Refuge, all of the areas are in the coastal marsh zone of South Louisiana. Refuges comprise 177,000 acres and wildlife management areas comprise 251,000 acres.

Management practices employed on the refuges and wildlife management areas are primarily directed toward improving wetlands for resident and migratory waterfowl. The multiple-use management concept is used wherever feasible, so that many other aquatic-based animals, including furbearers, fish and resident game and nongame birds, also benefit.

Public demand for recreational use of refuges and wildlife management areas continues to increase. Sport fishing, crabbing, and nature study are very popular activities on wildlife management areas.

An extensive law enforcement program is carried out on all Fur and Refuge Division managed property. Mineral activities on all the areas are closely monitored. Each activity is individually reviewed and must comply with the Department's mineral regulations, Deeds of Donations and various agreement letters.

Rockefeller Refuge

The state-owned Rockefeller Refuge, located in Cameron and Vermilion Parishes, comprises some 85,000 acres of prime coastal marshland. Impoundments varying in size from 480 to 5,680 acres have been constructed on the refuge to house the over 300,000 waterfowl that spend the winter on the area each year. Year-round residents include nutria, muskrat, raccoon, otter, mink, deer and alligator. Rockefeller Refuge also provides excellent habitat for a diverse and abundant group of wading birds.

During 1987, Project No. 16-02-00-84-3, designed to rebuild 45 miles of levee on Rockefeller Refuge, nears completion. The remaining work deals with several small sections of levees which must be brought up to grade. Work progressed on this contract in a very orderly fashion, with a minimum of breakdowns.

Project No. 16-02-00-85-1 deals with the restoration and maintenance of facilities at the headquarters area. The project was reviewed and revised in 1986. The low bidder was within the allocated budget on the project, including all alternates. Work is nearing completion on the residences and general quarters building. The office complex, probably the largest portion of the renovation project, remains in a state of flux. Probably over one-half of the work here has been completed. The renovation work in the office complex continues in conjunction with a working and active office staff.

Project No. 16-02-00-83-2 has been completed in 1987. The contractor has completed major repairs on the Big and Little Constance control structures and the Royalite Canal plug. Two new aluminum automatic water release structures were installed in Unit #6 to allow removal of excess water from that important alligator nesting study area. Also, two new weirs were installed on the west fork of Rollover Bayou and another on Pigeon Bayou.

The Mobil Oil Company recently dropped the lower portion of their mineral lease on Rockefeller Refuge. Meeting with the environmental section of Mobil Oil and the technical staff of Rockefeller Refuge, plans were formulated to restore this area as much as possible. Work began by removing a 24″ abandoned production line. Also, several dead end location canals were plugged with an earthen dam and capped with reef shell. All abandoned production facilities were removed and all flow lines were dug up, removed, and the ditches backfilled. A large dam with a water control structure will be constructed in the main canal just south of the junction of Dyson Bayou. Mobil Oil has further agreed to maintain this structure as long as their mineral lease remains active on the Refuge.

A portion of Project No. 16-01-00-82-12 was rebid in 1986 and all bids were rejected because they were over the budget allocations. The money was then used by the Louisiana Department of Wildlife and Fisheries to purchase materials for the Fur and Refuge Division personnel to rebuild the structure. During the remainder of 1986 and throughout all of 1987, the field crew removed the partially completed structure installed by the contractor and salvaged some of the material and relocated just south of the site. To keep this water control unit in tact, an earthen levee was installed in the canal where the original structure was removed. This earthen plug was capped with oyster shell and armorflex mats. Also, the structure on the east side of the canal installed by the same contractor had failed so Department personnel had to repeat the procedure on this site. All salvageable material was removed and an earthen plug was installed. This plug was strengthened with steel interlocking sheet piling and later capped with oyster shell. Work was completed on relocating and installing both these water control structures by Department personnel. Work would have been completed earlier; however, this crew was sent to the Saline-Larto Lake complex to repair a levee and water control structure that washed out during periods of high water. A seven-man construction crew from Rockefeller spent eleven weeks rebuilding this structure. A division dragline and bulldozer were transported from Rockefeller to accomplish the work. Game Division also provided a large dozer capable of moving the man-sized rocks. The crew cleaned the area, drove 300 feet of steel sheet pilings and completed the work by replacing all of the rock fill material.

The construction of a new airstrip on Rockefeller Refuge was begun by mitigation work performed by Penn zoil Oil and Gas Company. A major access canal used by this company was dredged and the spoil was depositing according to the recommendations of the technical staff on Rockefeller Refuge. Later, Fur and Refuge Division draglines were assigned the task of leveling the spoil in order that conventional equipment (tractors and road graders) could work this material into a flat road bed. Later rye grass was planted to prevent erosion. This strip, when completed, will be approximately 4000′ long and approximately 200′ wide.

The East End Locks, the largest water control structure on the Refuge, received minor repairs during the past year. The ram which operates the south gate was replaced. Further inspection indicated this structure was in immediate need of major repairs. Along with the assistance of personnel from the DOTD, drawings and estimated cost figures were prepared. A capital outlay project covering the renovation of this structure has been submitted and approved.

Public recreational use of Rockefeller Refuge has greatly intensified in the last year resulting in additional work responsibilities for the staff. Aspects of refuge management which were especially impacted included boat launch facility maintenance, water control structure maintenance, road upkeep, information and education services, facility beautification work, and enforcement effort.

Marsh Island Wildlife Refuge

Marsh Island Wildlife Refuge (donated by the Russell Sage Foundation) is located on the Gulf Coast of Louisiana in the extreme southern part of Iberia Parish. The marsh types found on Marsh Island (approximately 95% brackish marsh and 5% saline marsh) are high in biological productivity and support a wealth of natural resources including thousands of migratory waterfowl, shorebirds and furbearers.

A headquarters renovation project was continued during 1987 and included additional work on the utility room under the main camp and repainting the pantry. Other facility maintenance included the changing of over 200 ft. of water pipe, installation of a new water well, construction of a shed for fuel drums, installation of two ice makers and refrigerators, repairs on wharf, painting of the camp, and construction of a tool shed. In order for the Refuge to function on a daily basis, extensive maintenance is required on an array of equipment. Preventive maintenance was conducted routinely on all boats, vehicles, outboard motors, generators, pumps, and hand tools. Additionally the entire Refuge boundary was posted at .25 mile intervals.

Monitoring of water salinities (39 sites) and water levels (12 gauges) were conducted weekly throughout the year. Daily temperatures and rainfall amounts were also recorded.

Various marsh management practices were utilized on Marsh Island to enhance wildlife populations. Annual burning of marsh vegetation was done in an attempt to promote the growth of three-cornered grass (Scirpus olnevi). With the completion of the impoundment water control structure in 1986, water levels were regulated and monitored in 1987. Drawdown was achieved in both impoundment units and consequently production of waterfowl food plants was achieved. Soil salinities remain high in the impoundment as a result of the 1985 hurricane and tidal surge and may reduce the abundance of high quality waterfowl foods for some time. Two earthen plugs in the impoundments were recapped and shelled during the summer.

The annual trapping program on Marsh Island during 1986-87 season resulted in a harvest of 13,047 nutria, 1,207 muskrats, 478 raccoons, 20 mink, and 6 otters. Preparations for the 1987-88 season included repairs and painting on the two existing trapping camps, construction of 1 new trapping camp and construction of 3 small buildings for trappers to utilize to skin and dry their fur.

In conjunction with the alligator research projects on Marsh Island, a second experimental harvest of alligators was conducted during July and August 1987. Other research activity included an inventory of bird species commonly found on the Refuge and a trap evaluation research project which started in December 1987. Departmental personnel live-captured 180 nutria and released these animals in an attempt to reestablish nutria populations in two areas near Pecan Island.

During 1987 Refuge personnel enforced all rules and regulations pertaining to Marsh Island Wildlife Refuge and those involving the Vermilion Bay, Cote Blanche Bay and near offshore waters. Specific cases on the Refuge included confiscation of several hundred crab traps and gill nets that were illegally set. Citations were issued for shrimping violations (30), unattended gill nets, undersize crabs, butterflying on the Refuge (4), illegal harvesting of oysters, and over-the-limit on cast netting for shrimp. Assistance was provided on a regular basis for both sport and commercial fishermen experiencing mechanical failure.

Public utilization of the Refuge for sport fishing activities was extremely high in 1987. Activities included fishing, crabbing and cast netting for shrimp.

State Wildlife Refuge

State Wildlife Refuge contains 13,000 acres of brackish marsh habitat and is located on the western shore of Vermilion Bay. Habitat management of this Refuge is directed toward providing wintering habitat for ducks and geese. State Wildlife annually winters in excess of 100,000 snow geese and thousands of ducks.

During 1987, routine daily maintenance was conducted on the Refuge headquarters facility, the grounds, and all assigned equipment. The headquarters, boatshed and tool shop were cleaned and painted. Preventive maintenance was performed on all boats and motors.

A replacement facility was constructed by Departmental personnel at the Refuge headquarters site. The facility replaces a trappers camp which burned in December, 1986. Insurance monies of $46,000 were used to purchase materials for construction. This 1,800 sq. ft. building will be utilized to host Departmental staff meetings, workshops involving out-of-state fur biologists, marsh management meetings and, during the annual trapping season, the facility will be utilized as a living quarters for trappers. State Wildlife personnel assisted in construction by hauling necessary building materials and supplies and assisting the carpenters whenever necessary. In addition to this facility, a fur processing building was constructed at the headquarters site and at Hog Bayou and a small trapping camp was constructed on the southwest corner of State Wildlife Refuge. These new facilities will be instrumental in attempting to control and manage muskrat and nutria populations in future years.

During 1987 an extensive capital outlay project was completed on State Wildlife Refuge. Broussard Brothers, Inc. from Abbeville, La. was awarded the contract for this construction project. Weirs were constructed at South Lake, Bob Lake, Shallow Bayou and Redfish Point Bayou. These weirs will provide for access to these marsh areas during periods of low tide and will provide enhanced wintering waterfowl habitat by promoting the growth of aquatic vegetation. Extensive repairs were done to the North Lake bulkhead to stop erosion at the existing structure. The weirs at Prien Bayou and Hog Bayou were repaired and walkways were constructed on the top of these structures. A navigation channel was dredged to Hog Bayou to provide access during periods of low tide. A new bulkhead was constructed surrounding the existing headquarters facility and a new boat shed was constructed on Bayou Fearman. This extensive project will provide for enhanced marsh management for many future years. Additionally, the new bulkhead will act to secure our entire headquarters facility from constant erosion. The total cost of this capital outlay project was $1,134,799.

During 1987 marsh management practices that were utilized included marsh burning to promote three-corner grass production, general maintenance around existing water control structures, and harvesting of abundant furbearers. The 1986-87 trapping season harvest included 3,389 muskrats and 787 nutria. During the fall of 1987 it became evident that muskrat populations on the Refuge were expanding rapidly and that an extensive trapping effort would be required to attempt to control these populations during the 1987-88 season. Approximately 20 trappers harvested approximately 10,000 muskrats and approximately 1,500 nutria during 1987. This extensive trapping effort will be continued into January and February 1988 in an attempt to prevent excessive marsh damage.

Concentrations of snow geese in January and February of 1987 caused extensive marsh damage on some areas of State Wildlife Refuge. During the fall of 1987 high concentrations of snow geese were once again wintering on the Refuge. Refuge personnel attempted to redistribute these from one area to another by marsh burning and were somewhat successful, thereby helping to minimize habitat damage.

During 1987 substantial recreational use at State Wildlife for sport fishing and sport shrimping occurred. Along with these recreational activities, substantial time was spent enforcing the various rules and regulations on State Wildlife Refuge. Refuge personnel also assisted local enforcement agents in enforcing commercial fishing and shrimping laws. The patrol boat (Mr. McIlhenny) was used for patrolling in Vermilion Bay and near offshore waters. This boat was frequently used to assist the Vermilion Parish Sheriff's Department in search and rescue operations. Large numbers of both sport and commercial fishermen were provided assistance when they experienced equipment failure.

Atchafalaya Delta Wildlife Management Area

The Atchafalaya Delta Wildlife Management Area consists of approximately 137,000 acres of shallow water bays and marshes. Nearly 13,500 acres of the emerging delta have been colonized by vegetative communities. Extensive areas lie just beneath the water's surface, are exposed during periods of low tide and will become vegetated in the near future.

In order to facilitate operating such an extensive WMA, maintenance of the headquarters facilities and associated equipment is of major importance. In addition to washing the headquarters building, routine daily maintenance was conducted on the main camp, generator buildings, Wax Lake Patrol camp, storage buildings and all boats and motors. Due to the remoteness of the area, it is of special importance to perform preventive maintenance on all boats and motors and to keep communication devices functioning at all times.

Recreational opportunities abound for the public on Atchafalaya Delta Wildlife Management Area. Activities include waterfowl and rabbit hunting, sport fishing and bird watching. During 1987 improvements were made to the overnight camping areas at the Wax Lake Outlet and at the Main Delta. These improvements included land leveling, grass planting, and construction of tables and mooring sites. These camping areas are used frequently during the waterfowl and rabbit season and are receiving increased utilization from commercial fishermen.

Department waterfowl surveys during the Fall 1987 indicated extremely high concentrations of ducks (mallards, pintails, teal, widgeon, gadwalls and canvasbacks) on Atchafalaya Delta WMA. These high concentrations of birds along with a period of unusually low tides resulted in an outbreak of Avian Botulism Type C on one area of the Main Delta in late October. Between October 27 and November 5 an extensive effort was made by Department personnel to stop this die-off of waterfowl. The procedure involved:

1) Collecting (by airboats) all dead and sick birds visible. Dead birds were incinerated and buried. Sick birds were held in captivity and provided fresh water and feed.
2) Harassment of waterfowl in the affected area to prevent healthy birds from becoming infected. Harassment was accomplished by continual running of airboats and strategic placement of carbide guns.

Approximately 500 carcasses were collected and burned and approximately 180 sick birds recovered and were banded and released. Species that were most affected included green-wing teal, pintails, coots and mottled ducks. These efforts were successful and the outbreak of Botulism was stopped by November 5, 1987.

The 1987 waterfowl season was successful in terms of both hunter effort and success. On opening day in excess of 150 hunters utilized the Wax Lake Delta alone. Additionally, large numbers of hunters utilized the Main Delta. The most common species harvested included teal, pintails, mallards, gadwalls, mottled ducks and widgeons. Rabbit hunters were also successful during 1987.

Plans to construct two small semi-impoundments to provide habitat diversity for waterfowl were prepared during 1987. One impoundment was completed; however high water subsequently damaged a portion of the levee and is currently in need of repair. Water level manipulation will be accomplished through the use of flapgated culverts of appropriate sizes. We will attempt to achieve spring draw downs for annual grass production and to hold water during periods of low tides during winter months.

Through funding provided by the Louisiana Board of Regents, a project entitled "Wetlands Habitat Evaluation and Management - Vegetation and Waterfowl Habitat Value of Newly Created Islands in Atchafalaya Bay" was completed during 1987. Principle investigations were Charles E. Sassar and Deborah A. Fuller from the Center for Wetland Resources at Louisiana State University. The research project provided valuable information on development of plant communities, plant species composition and biomass production, waterfowl utilization, food utilization by waterfowl, benthic invertebrate populations and the effect of grazing by herbivores on vegetation at the Atchafalaya Delta WMA.

A substantial amount of manpower was required for enforcement activities associated with the Atchafalaya Delta WMA and its surrounding waters. In addition to enforcing specific rules and regulations on the WMA, Division personnel assisted in enforcement of commercial shrimping, fishing and oystering rules and regulations. The patrol boat "Atchafalaya" was used extensively during the spring and summer to enforce the inside closure of shrimp seasons. Airboats from Atchafalaya Delta WMA assisted local enforcement agents in locating baited waterfowl ponds in surrounding marshlands. These enforcement agents assisted our personnel during opening weekends of waterfowl season to enforce pertinent hunting regulations (shooting hours and bag limits). The boat "Atchafalaya" was also used to ferry individuals on field trips to Atchafalaya Delta WMA, Marsh Island Wildlife Refuge and to State Wildlife Refuge.

Pass-a-Loutre Wildlife Management Area

The Pass-a-Loutre Wildlife Management Area is composed of 66,000 acres of marshland located at the mouth of the Mississippi River in Plaquemines Parish. The area is extremely productive for waterfowl due to its location at the terminus of the flyway system and production of choice waterfowl food plants. The entire Delta system in which the management area is located has been experiencing significant marsh loss. Due to the extreme marsh loss rates that are occurring in the Mississippi River system, several innovation marsh creation projects have been underway on the management area.

One such project utilized man-made canals to direct sediment into subsided bay systems. The project shows potential for creating marsh within these open water areas. The project was submitted by the Department in 1983 to the Governor's Coastal Erosion Task Force which confirmed the project and allocated approximately one half-million dollars for construction and scientific study. Construction of the project was completed in the summer of 1986 and researchers are now documenting the effectiveness of the silt diversion canals. The canals vary in width from 150-ft. to 400-ft. and island formation was observed after the spring flood of 1987. Specific accretion rates will be computed in August of 1988, but observations indicate that the South Pass site is accreting at the fastest rate. Island formation will be dependent upon the magnitude of the 1988 spring floods.

A second study which is presently underway has also shown promise in the area of marsh creation. This study utilized synthetic materials to capture sediments which may ultimately be transported into the Gulf and lost to the natural Delta building processes. A pilot project was completed in 1983; an expanded study was initiated in February, 1984. Results of the study indicate that sediment fencing has potential for creating marsh in overflow delta systems. Observations in the summer of 1987 revealed that open bay systems were converted to vegetated marsh. Expansion of the concept to the Atchafalaya Delta and investigating potential uses in various wetland systems were initiated during 1987.

Water Quality Stations were set up in 1986 to provide baseline and trend information as to the salinity regime of the management area. An RS5 salinometer is utilized in obtaining salinity, conductivity and temperature data. Water quality data was obtained throughout 1987.

A third year of an experimental archery season was completed during 1987. A permit system was initiated during 1987 to enable the Department to accurately record harvest and hunter effort. During the 45 day season, 19 deer were harvested with 194 hunter efforts which calculates to 1:10 success rate.

Salvador Wildlife Management Area

The Salvador Wildlife Management Area is located along the northwestern shore of Lake Salvador in St. Charles Parish. The area is comprised of approximately 30,000 acres of fresh and intermediate marsh which produces ideal habitat for waterfowl. A sizable deer herd is present within this wetland system. Natural levees, wax myrtle thickets, and access canal levees create a diversification of habitat which has provided good conditions for the present deer herd. Division biologists have been closely monitoring the increasing deer population on the area.

The third either sex deer harvest was conducted during 1987 for a period of three days. A total of 105 deer were harvested by 1,087 hunter efforts. The harvest ratio was calculated to be one deer per 10 hunter efforts which appears to be an excellent ratio for a marsh system. Data obtained from the managed hunt will be utilized in conjunction with other information for management decisions for the upcoming 1988 season.

Additionally, during 1986 a research project was initiated to study movement of the floating marsh system of the management area. The project was initiated as a post graduate research project through the Louisiana State University and was completed during the early part of 1987. The study confirmed the "Flotant Marsh Theory" indicating that sections of the Salvador Management Area exhibit vertical movement with tidal fluctuation.

During 1986 the Corps of Engineers in conjunction with the U.S. Fish and Wildlife Service and the Department reviewed the Salvador WMA for potential management sites for mitigation associated with a segment of the westbank hurricane protection levee. During 1987 Congress authorized mitigation for a segment of the westbank hurricane protection levee. The mitigation package included acquiring properties in excess of 1000 acres and authorization of one or more water control structures. The Department is expecting a final approval during 1988.

Pilot projects utilizing the sediment fencing concept were initiated in 1987 along the Lake Salvador shoreline and interior oil field canals. Structures are being elevated to determine if an economical erosion control system can be devised to reduce land loss along the canal system and lakeshore area. A large scale project has been funded to test the concept and construction will begin in April of 1988. The project is being conducted in cooperation with the La. Geological Survey.

The Soil Conservation Service, in cooperation with the Department, completed a detailed marsh management plan for the area. The plan included a description of the area, historical background, management objectives and goals, planned land use and methodology, water management scheme and evaluation sites. The management plan will be utilized to maintain and enhance the management area when mitigation or Department funds are available.

Pointe-Au-Chien Wildlife Management Area

The Pointe-au-Chien Wildlife Management Area is comprised of approximately 30,000 acres of marshland. Marsh types vary from nearly fresh to brackish. The area provides habitat for waterfowl but is gradually changing to a more saline environment which is more conducive to marine organisms. In addition to increased salinities, the area has experienced extreme marsh loss rates in recent years. Factors which have influenced this deterioration trend include, but are not limited to, saltwater intrusion, canalization, reduction in fresh water and sediment influx, subsidence, extreme tidal fluctuation, erosion, and a rise in sea level. The following projects have been proposed to offset this significant marsh deterioration process:

The Montegut Project will place approximately 3500 acres of wetlands under management. The project is located southeasterly of Montegut between two natural ridge systems formed by Bayou Terrebonne and Bayou St. Jean Charles. Approximately 45 miles of levee and (2) fixed crest weirs will place this wetland system under management and ultimately enhance wildlife and fishery resources of the area. During 1983 the project was proposed to the Governor's Coastal Erosion Task Force. In mid-1986 the project was let for bids. All bids received were above the proposed funding level. The project was rebid and construction initiated during the latter part of 1987. Project completion is scheduled during 1988.

The Grand Bayou Project encompasses approximately 4500 acres of wetlands located immediately west of Grand Bayou and Cutoff Canal. Similar to the Montegut and St. Jean Charles Projects, the area has experienced significant wetland loss. The project proposes approximately seven miles of levee system with three fixed crest weir structures. The U.S. Fish and Wildlife Service in coordination with our Department has submitted the project to the Corps of Engineers as potential mitigation for the Larose to Golden Meadow Hurricane Protection Levee. Two of the three weir structures have been completed by the Department and approximately two miles of levee and numerous plugs within the system. A final report is in the process of completion by the Corps of Engineers [which should clear the path for construction of the remainder of the project]. A conditional approval was granted by the Corps of Engineers during the latter part of 1986. During 1987 National Marine Fisheries Service requested that the Corps of Engineers consider construction slotted weirs in place of the traditional fixed crest weirs. Environmental agencies in cooperation with our Department are presently addressing the feasibility of this request. Federal Emergency Management Agency (FEMA) funds were utilized in 1987 to repair several segments of levee damage associated with Hurricane Juan in 1985.

The Bully Camp management unit is located west of the Bully Camp Oil and Gas Field and is bordered entirely by petroleum access canals. The area encompasses approximately 1000 acres. Hurricane Juan in 1985 damaged a large portion of the levee system of this unit. FEMA supplied funds to rebuild the levee system which was completed during mid-1987. Two water control structures and several earthen plugs will be required to place the unit under management.

Water Quality Stations have also been set up throughout the Pointe-au-Chien area. Salinity stations were maintained throughout 1987 and data is presently being utilized in the formulation of management plans for the area.

Two marsh restoration projects are scheduled to be initiated during 1988. One project is utilizing sediment fencing as an erosional control in conjunction with vegetative plantings along interior oil field and spoil banks. The second study involves the use of revegetation procedures in areas of deteriorated wetlands. The projects are being conducted in cooperation with the La. Geological Survey.

Maintenance Section

The Maintenance Section accomplished a number of varied tasks in the upgrading and maintaining of facilities and areas of the Fur and Refuge Division. At Rockefeller Refuge, due to the increased demand for alligator hatchlings, the section built two new incubation tanks to allow for the hatching of an additional 4,000 eggs.

Plans were made to build a complete new structure at State Wildlife Refuge. The Hog Bayou trapper's camp, which had burned during the winter, was replaced behind the Headquarters Camp. This structure is a duplex capable of sleeping 12 people. The building was planned and built by the maintenance section. To complete the trapper's facility, an existing barn was converted into a skinning and drying shed with three separate insulated and heated drying rooms, skinning tables and racks. As part of the crew was completing this camp, another crew was at Pass-a-Loutre Wildlife Management Area preparing the facilities for the filling in of the leveed yard with pumped-in spoil from the adjacent passes. Since the anticipated rise in ground level would be approximately four feet, everything in the yard had to be raised above this level. The ground floor of the headquarters building was dismantled and all plumbing and electrical equipment were revised and raised. The two 22,000-gallon water reservoirs and a 30′ × 60′ metal building were elevated. An 8′ × 120′ elevated walkway was built to the headquarters camp and a new entrance opening on a new front screen porch was built, adding an extra dimension to the headquarters building. To insure the right amount of pumped-in spoil, the levee around the yard was raised several feet and the inlet to the boat slip was dredged out. At Pass-a-Loutre, the four bathroom floors were removed, new subflooring was installed and finished with vinyl flooring. New lights were installed throughout the building and new ceiling tile installed in the kitchen.

The Enforcement Division needed to secure their large vessels at LUMCON in Cocodrie so piles were driven and braced and a platform built to facilitate loading and unloading.

To protect Pointe-au-Chien from excessive high water, the levee encircling the 15 acre headquarters area was raised and widened by dredging. Maintenance personnel used draglines to clean many miles of marsh ditches in the 9,000 acre waterfowl impoundment on Marsh Island Refuge.

RESEARCH

The Fur and Refuge Division's research program is managed by three biologists stationed in North Louisiana, nine biologists in coastal Louisiana, and a number of non-technical support personnel. Programs of research responsibility included statewide alligator research and harvest, statewide fur research and management, research directed toward marsh enhancement, marsh ecological monitoring, alligator farm research, statewide alligator farm extension service, Canada geese and brown pelican conservation programs, estuarine fisheries research, pond culture studies and, very importantly, research directed towards conservation of Division managed property. The dissemination of information was an important function of the Fur and Refuge Division during the past year. Scientific information was distributed in the form of lectures to visiting school/university groups, technical writings, symposia presentations, in-service training programs, landowner/farmer extension, department movies, magazine articles, and through the news media. Professional expertise was provided for the implementation of international, federal and state legislation/regulations governing the wise use of alligators and furbearers.

Also, the technical staff of Rockefeller Refuge is deeply involved with the implementation of marsh management plans not only on the Fur and Refuge Division property but also on private lands. In the past, many large landowners across the coast employed a staff of maintenance personnel and equipment capable of maintaining isohaline lines in a relatively stable and permanent position. However, since the passage of the Clean Water Act and the Section 404 permitting process, the majority of this marsh preservation work has stopped. Private landowners are no longer allowed to maintain marshes for duck hunting and trapping without applying for and obtaining both a federal and state coastal use permit.

The purpose of the permitting process was to reduce marsh alterations, and only projects with approved management plans, which would benefit both fish and wildlife, are approved. Projects that allow for ingress and egress of marine organisms also facilitate the continued inland advancement of saline waters. As a result of this decision by the Corps of Engineers, the isohaline lines continue to encroach inland each year, and more and more salt water marshes are being created. The fresh vegetative type, which provides the best waterfowl habitat, is being reduced in size by the inland advancement of the more saline vegetative type, which provides the poorest waterfowl habitat.

Some of the coastal federal refuges are no longer managing their lands for waterfowl as was originally intended. Local and national pressure groups have persuaded the federal refuge system of the importance of the continued advancement of the salt water habitat. Rather than maintaining or managing stabilized marsh conditions as in the past, salt water is encouraged to move northward at an alarming rate. The technical staff at Rockefeller Refuge, rather than encourage the advancement of salt water and the reduction of marsh habitat, and realizing the importance of stabilized marsh conditions, spends much of their time working with private landowners and local government agencies in the preparation of management plans required by the permit system.

In the spring of 1987, a portion of the striped bass for Louisiana's anadromous program were reared at the Fur and Refuge Division's Rockefeller Refuge. This project resulted in 38,157 fingerling fish being stocked in the Mermentau River and 87,250 in the Calcasieu River during 1987. Since the initiation of the project in 1972, 1,259,261 have been placed in the Calcasieu and 746,130 in the Mermentau River systems from the Rockefeller Refuge ponds. As a result of this program sport fishermen of Southwest Louisiana have reported catching stripers up to 21 pounds in weight.

Growth and movement studies of the commercially important channel and blue catfish were continued during 1987. Fish were captured in slat traps, tagged and released at the capture site in the lower Superior Canal complex on Rockefeller Refuge. Thus far, over 12,000 catfish have been tagged. The most spectacular movements have been by channel catfish. Several fish have been caught by fishermen over 50 miles from tagging site.

Several aquaculture projects were conducted during the past year at Rockefeller Refuge. It is realized that often a landowner will select the land management practice which brings in the most income. Therefore, the Fur and Refuge Division, with the desire to keep our coastal wetlands as wetlands, has continued to investigate the potential various species for culture. Past studies have dealt with croaker, mullet, pompano, catfish and crawfish.

Polyculture studies with freshwater prawn and golden shiners were completed during this past year. It was determined that the co-production of these two species was biologically possible in coastal Louisiana. Persons already in shiner production (Louisiana has 4,000 acres) could realize extra income from their ponds with just a little more investment. The data for this three-year study will be analyzed for publication.

Ponds were stocked with juvenile white and red crawfish during the winter of 1986. After 129 days, production ranged from 207 to 330 lb/ac of 34 gm white crawfish and 16 gm red crawfish. The aspect of stocking juveniles deserves additional study.

Redfish fry were stocked in an experimental pond July 1, 1987. Fingerlings were harvested August 4, 1987 and research ponds were restocked to evaluate various stocking densities. Samples for growth are conducted monthly. Plans are to use this data in the refigurement of a 1988 cooperative project with LSU.

A fisheries investigation began at State Wildlife Refuge in 1987. This study conducted by USL is to analyze the populations of aquatic animals in the refuge, especially in relation to the effects of weirs.

A recreational use survey of the 84,000 acre Rockefeller Refuge began in 1986 and continued through 1987. By May, 1987, the vehicular count for Price Lake Road totaled 7,800 though it was closed to traffic for three winter months. Vehicle counts for the East End Locks and East End Boat Ramp totaled 6,500 and 8,700, respectively. Additional data concerning man-days of recreation and specific utilization is currently being analyzed and will be published in the future.

Some of the most notable research projects conducted by the Fur and Refuge Division have been basic life history studies of the American alligator. Most recently, studies investigating temperature-sex dependence, stress factors, and reproductive biology have added greatly to the general knowledge of the alligator and have benefitted alligator/crocodile conservation programs throughout the world. Alligator research projects active during 1987 involved pen culture studies; egg incubation investigations; controlled environmental chamber culture; specialized laboratory study of blood, bone, and tissue samples; age determination of a group of femur samples; alligator nutrition studies; and the characterization of ecological and environmental factors affecting alligators. The Chinese alligator propagation project was continued during 1987 with one nest and 13 hatchlings produced from this nesting effort.

Encouraging results were achieved, after years of study, in the development of a dry alligator ration for use in the alligator farming industry. This project, a cooperative effort with Louisiana Department of Wildlife and Fisheries, LSU Medical School personnel and the University of Georgia, demonstrated that alligators fed on a commercial-type ration can grow as well as those fed on nutria.

Louisiana's reintroduced brown pelican colonies produced approximately 1,400 fledglings in 1987. A nesting effort of 13 nests was first noted on Raccoon Point in the spring in 1987. This was a result of three years of restocking from the Queen Bess colony. However, these nests were abandoned and the eggs were preyed upon by nearby nesting terns. The cause of the abandonment of the nests remains unknown. Upon close inspection, it was discovered that a team of surveyors was on the island at that time. From aerial inspections and onsite inspection, tracks of large amphibious equipment and 3-wheelers were observed near the nesting colony. Survey stakes and human foot prints were observed throughout the nesting colony. It was further revealed that these survey personnel were coordinating their activities through several wildlife agencies. Hopefully, future activities on these nesting islands will be monitored more closely with restriction of all activity during the nesting season. In conjunction with Brown Pelican aerial productivity surveys, helicopter surveys were also made for bald eagle nests. Approximately 30 eagle nests were active during 1987 and produced 37 young birds.

Again in 1987, the 400+ Canada goslings produced were allowed to remain with the Rockefeller Refuge flock in an effort to revitalize the breeding nucleus of birds. The current flock at Rockefeller is approxiamately 4,500.

An evaluation of marsh management techniques on Rockefeller Refuge was continued in 1987. Vegetative transect data consisting of percent plant composition by species and cover were collected along with water level and salinity data by management unit. These data can then be compared to alligator nest densities, waterfowl use, waterfowl time activity budgets, and other animal-use parameters in order to characterize the productivity of the various management units on Rockefeller Refuge.

During 1987, studies were conducted relative to 13 major waterfowl research projects. These studies investigated: breeding and brood rearing activities of mottled ducks; sex ratios, plumages, and pairing chronology of Louisiana non-breeding waterfowl; abundance, diversity and time activity budgets of waterfowl using different types of management units on Rockefeller Refuge; relative abundance of invertebrates by management units on Rockefeller Refuge; and analysis of factors affecting the accuracy of aerial surveys for waterfowl; activity budgets, food habits, and condition of non-breeding green-winged teal in coastal Louisiana; and life history study of lesser scaup wintering in Louisiana. Additionally, preliminary work was begun on a project to investigate the temperal variability in the structure of wading-bird communities.

The five technical personnel at Rockefeller Refuge accounted for the publication of 14 technical and semi-technical papers during 1987. These publications are disseminated worldwide through the technical journals and also through literature requests made by the scientific communities throughout the world.

During 1987, an international herpetological meeting was held in New Orleans and largely sponsored by the Fur and Refuge Division. At this meeting, members of the technical staff of Rockefeller Refuge presented a paper dealing with their findings concerning the alligator research program.

FUR RESEARCH AND MANAGEMENT

During 1987 data collection and analysis continued on projects involving nutria, raccoon, river otter, fox and coyote interactions, alligators, fur harvest distribution, scent post study, and trap evaluation. Establishment of the Louisiana Fur and Alligator Advisory Council has been of top priority during 1987. Considerable time and effort has been spent on fur market analysis (emphasis on nutria) and development of programs and strategies to combat national and international anti-trapping campaigns.

Due to the importance of the nutria to Louisiana's fur industry, (generally accounting for approximately 54% of the total value) emphasis is placed on research, management and marketing of this species. Field research and evaluation of a project entitled "An experimental reintroduction of nutria and subsequent assessment of changes in population parameters" continued during 1987. The main objective of this project is to determine if it is feasible to introduce nutria into marsh areas where nutria populations have declined and are nonexistent or at extremely low densities but the habitat is suitable to support high populations of nutria. Evaluation of releases made in 1986 are ongoing and a total of 278 nutria (58% females) were captured and released into 3 study areas in 1987. A total of 180 of these animals were captured on Marsh Island Wildlife Refuge and the remaining 98 nutria were captured on Miami Corporation property in Cameron Parish. The release sites were in the vicinity of Pecan Island, Vermilion Parish. Preliminary evaluation indicates increasing nutria populations on these release sites. Additionally, 30 animals from each capture site were dissected and necropsied to provide information on pelt quality, genetics and reproduction on these source nutria. During 1988, nutria from the release sites will be evaluated to assess various changes which may have occurred due to these nutria introductions. If these reintroductions prove to be successful, land managers may attempt to introduce nutria into marsh areas that have vegetatively recovered from overutilization of nutria in past years.

A raccoon research project entitled "Raccoon Population Densities, Harvest Mortality and Hardwood Communities" was initiated in May 1987. Raccoons are currently the second most important furbearer in Louisiana with a harvest of 240,396 animals valued at $2.4 million. Specific objectives include:

1) Estimate population densities of raccoon in delta bottomland hardwoods.
2) Estimate percent of population harvested by trapping and hunting.
3) Estimate relative efficiency of each harvest technique.
4) Estimate natural mortality.
5) Determine impact of harvest on raccoon population. Live trapping for population estimates began in May 1987 and a total of 180 raccoons were trapped and released. Total raccoon captures and recaptures was 271. Recaptures of tagged raccoons by hunters and trappers are currently being evaluated. In order to achieve these objectives the mark and recapture study will continue for several years.

A coastwide helicopter survey was conducted in August 1987 to redefine the vegetative types of the coastal marshes. Due to the rapidly changing isohaline lines, it is important that this survey be conducted periodically to monitor changing marsh types. The vegetated type map generated from this work is routinely sought as a reference by many user groups. Additionally an intensive vegetative inventory and mapping project was conducted in the Mermentau Basin.

In cooperation with the LSU School of Forestry and Wildlife Management, 3 research projects were active during 1987. Field work was initiated during the spring of 1987 on a project concerning food preference of nutria in Cypress-Tupelo swamp habitat in southeastern Louisiana. Nutria droppings were collected quarterly from two study areas and specific plants were identified microscopically by cell structure. Understory species composition was determined in order to assess preferences or selection of specific plants by nutria. Overstory composition and crown closures are also being assessed to determine the effect of these variables on understory vegetation. Summer and winter nutritional content of the plants being consumed will be assessed. Also, nutritional content of the most commonly utilized plants in the swamp will be compared to the plants most commonly utilized in fresh and brackish marsh.

A second project involves habitat assessment on Marsh Island Wildlife Refuge relative to weired versus natural brackish marsh. Habitat assessment includes emergent and aquatic vegetation, historic and present day land to water ratios, and erosion rates on Marsh Island. Field vegetation analysis was conducted during the summer of 1987 and a series of aerial photographs have been obtained to assess land/water ratios and erosion rates.

A third project involves a telemetry study on fox and coyotes in central Louisiana. The basic objectives were to determine home range for both fox and coyotes and to assess the interaction and effect of increasing coyote populations on fox populations. Field work was completed in December 1987 and the student will complete data analysis and report writing during 1988.

A trap evaluation project was initiated on Marsh Island in December 1987. Three traps (#11 Longspring, #2 Longspring, and the fox Soft-Catch) were evaluated for foot injury and catch efficiency for harvesting nutria. The #11 and #2 Longspring traps are the two most commonly used traps for nutria in coastal Louisiana. The fox Soft-Catch trap is of comparable size and may provide an alternative to the standard traps currently utilized. The chain on the fox Soft-Catch trap was changed to match the chains currently used on the #2 and #11 Longspring traps. Preliminary data indicates that the fox Soft-Catch trap reduces foot injury, is capable of holding nutria and is similar in efficiency to the other traps being evaluated. A second experimental harvest of alligators was conducted on Marsh Island Refuge in 1987. A total of 1,000 alligators were harvested by fishing and 254 by shooting. The alligators were sold whole and processed for meat and hides. Approximately 22,000 lbs. of deboned meat and 7,320 feet of leather was obtained from these alligators. The alligators that were taken by the fishing method averaged 6.1 feet in length. Data analysis continues on sex ratios, size class frequency distribution and production rates. Other alligator research presently being conducted on Marsh Island includes nest counts, night counts, and tagging and release of alligators for growth estimates.

Scientific papers that were submitted for publication during 1987 include:

1) Reducing injuries to wild terrestrial furbearers by using padded traps.
2) Efficiency of padded traps in capturing terrestrial furbearers.
3) Population estimates of river otter in a Louisiana coastal marshland.
4) Nutria as a fur resource in the United States.
5) A telemetric study of adult alligator snapping turtles.
6) Three chapters in the text "Wild Furbearer Management and Conservation in North America". Chapter titles are "Nutria", "Furbearer Management in the Southeast" and "Furbearer Harvest in North America."

Various projects are conducted annually to monitor furbearer population trends, total harvest and harvest rates. A scent post survey consisting of approximately 1,500 stations is conducted in October to index bobcat, fox, coyote and raccoon populations. Mandatory fur buyer-dealer reports are submitted annually to provide information on total fur harvest by species and fur harvest distribution.

The Fur Research and Management Section hosted the Southeastern Fur Resources Workshop on November 16 - 19, 1987. The Workshop was held at the State Wildlife Refuge headquarters facilities. Nine state wildlife agencies were represented by 12 biologists and 5 Animal Damage Control (USDA) personnel from Louisiana and Mississippi were present. Topics of discussion included beaver damage, relationship between various states and the federal Animal Damage Control program, furbearer population and harvest monitoring techniques, fox running pens, various research projects on raccoon, fox, coyotes, and bobcats, anti-trapping movements and soft-catch traps.

Additionally, personnel from the Fur Research and Management Section assisted in the following Division programs and projects:

1) Administration of the annual state-wide alligator harvest program for Iberia, St. Mary, St. Martin, Assumption, Terrebonne and Lafourche Parishes. This area accounts for approximately 41% of the tags issued each year.
2) Assisted Rockefeller Refuge personnel in conducting an annual coastwide alligator nest count survey.
3) Verification of alligator hides prior to out-of-state shipment.
4) Assisted Rockefeller Refuge personnel in conducting an alligator skin grading project in which over 5,000 skins from throughout the state were examined.
5) Assisted Minden personnel in conducting alligator research on Salvador WMA. This research consisted on an extensive tagging program, night counts, nest counts, and harvest season.
6) Assisted Minden personnel in analysis and report writing on an alligator reproductive study entitled "Management implications of a female alligator reproductive study".
7) Assisted Salvador WMA on check stations for managed deer hunts in November 1987.

During 1987, the Louisiana Fur and Alligator Advisory Council was officially formed. Members were appointed and the first meeting was held in March 1987. A total of 8 meetings were held during 1987. The establishment of the Council demonstrates a new awareness. The major coastal land companies and the Department of Wildlife and Fisheries recognized that management of fur resources, particularly muskrat and nutria, is nearly impossible if a strong economic incentive is missing. Simply stated, if prices paid to the trapper are too low the number of trappers and their efforts are greatly reduced; consequently the harvest is inadequate. This results in overpopulation and destruction of sections of marsh along the coast. The new awareness is that involvement in marketing is essential to stabilize and enhance the state's fur industry. Therefore, one of the two major goals of the Council is to develop and carry out marketing strategies through advertisement and promotion to enhance fur prices.

The other major objective involves education of the general public. A worldwide movement has been underway for a number of years involving the growth of organizations opposed to all use of animals and supporting the development of a public attitude that would give animals "rights" equal to man. The public is bombarded through the media with anti-hunting and trapping propaganda. Working through the same media along with other national and international organizations, the council hopes to effectively counter this misinformation with the simple facts. The basis for these facts is that trapping plays an important role in managing furbearing species.

Some of the more important projects that the Council is currently involved with include:

1) Advertising campaigns for Louisiana fur products
2) Montreal Fur Fair
3) Purchase of 2 portable displays to promote Louisiana's furs and alligators and educate the public concerning the role of harvest in management
4) Brochure development
5) Purchase of display furs
6) Public opinion survey of focus groups (in major U.S. markets) to assess the public attitude concerning the utilization of animals for fur
7) Development of effective educational material
8) Support publication cost of a text entitled "Wild Furbearer Management in North America,"
9) An alligator skin grading project
10) Support a world trade study of Crocodillians.

During 1987 the Fur and Refuge Division continued its commitment to keeping abreast of all pertinent national and international developments concerning the animal rights and anti-trapping movements. Greg Linscombe is the Department's representative on the Fur Resources Committee of the International Association of Fish and Wildlife Agencies. Greg represented the Department in Connecticut to testify at legislative hearings on an anti-leghold trap bill. Additionally he traveled to Montreal, Quebec City, Minnesota, North Carolina, Washington and North Bay to develop strategies to combat anti-trapping sentiment, to develop trap standards and to develop marketing strategies for Louisiana furs. Greg also presented a paper entitled "Nutria as a Fur Resource in the United States" at a scientific conference on "Nutria" in Yugoslavia. While in Europe, he also visited Germany and obtained vital information from some of the largest purchasers and tanners of Louisiana nutria. Greg also toured many nutria farms in Poland and returned with significant knowledge relative to raising nutria in captivity.

Louisiana Natural Heritage Program

The Louisiana Natural Heritage Program (LNHP) is a comprehensive, computer-assisted state ecological inventory. The program was transferred from the Department of Natural Resources July 1, 1986 to the Department of Wildlife and Fisheries and administered by the Fur and Refuge Division. The heritage staff is comprised of a coordinator, botanist, zoologist and ecologist. The Nature Conservancy is presently under contract to provide a landowner contact to register LNHP sites. The primary objectives of the LNHP are:

1) to gather information systematically and on a continuing basis on the occurrences of rare, threatened and endangered (r/t/e/) species and significant ecological features of the state, including outstanding examples of native ecosystems, and critical areas benefiting the environment;
2) to assemble and store this information efficiently in our data management system;
3) to make data retrieval utilitarian and cost-effective so that the potential impact of various activities on identified lands can be evaluated; and
4) to set rational conservation plans.

Information about the status and distribution of r/t/e/ species, natural communities, and other special features in the state is collected and stored in a centralized data management system. Map files, manual files, and computer files keep information well-organized and easily accessible. Records are indexed by name, location, status, watershed, and land ownership creating a flexible user-request system.

The LNHP provides practical, up-to-date information to public and private policy-makers. Applications of the data base have been used in virtually every aspect of biological conservation.

From January 1, 1987 to January 1, 1988, 176 data requests and permit applications were answered and reviewed, including reviews of community development projects, NPDES permits from EPA, U.S. Corps of Engineers permit applications for the entire state, Coastal Management's Division's coastal use permits, as well as requests from universities, individual citizens, other state agencies, and private conservation organizations.

The LNHP database contains 539 elements in three classes: special plant, special animal, and natural communities. One or more occurrences have been identified for 78 percent of these elements. Of the more than 2,500 element occurrences now on file in the data base, 1,182 are locations of special plants, 952 special animals, 311 natural communities and 252 are unique features such as waterbird nesting colonies. The data base also includes information on 250 managed areas within the state as well as 1,821 source abstracts. In previous years the LNHP developed the first statewide natural community classification system with seven natural community systems containing 75 distinct communities characterized. The Heritage Program has located high quality examples of 85 percent of the communities with a state rank of S1-S3 (endangered-rare). Over 126 sites were surveyed by Heritage staff, scientist on contract, and trained volunteers in the past year focusing on areas and communities in need of field research. The first comprehensive list of rare, endangered, and threatened species of plants and animals was developed by the LNHP in 1985. Of the approximately 2,500 species of vascular plants native to Louisiana, about 292 (12.7 percent) are rare or warrant further consideration to determine their status. Records of all known localities of 260 of 292 species have been computerized with 58 percent of these rare plant locations discovered or updated since 1982, and over 60 percent due to the efforts of the Heritage botanist and ecologist. The Special Animal list includes 21 species of invertebrates, 28 mammals, 12 amphibians, 26 reptiles, 51 birds and 34 species of fishes. All known occurrences have been computerized for over 58 percent of these species.

The Vertebrate Characterization Abstract (VCA) is a newly incorporated database of the LNHP. The VCA is a record of various attributes of each vertebrate species' taxonomy, phenology, distribution, habitat, food habits, activity patterns, and reproduction and development. The initial data entry for all 890 Louisiana vertebrates was completed in 1987; the data will be proofed and updated in 1988. Additionally, a new field that provides specific plant community associations will be added.

Other major accomplishments of the LNHP during 1987 include:

1) Publication of The Natural Communities of Coastal Louisiana -Classification and Description.
2) Plants and Animals of Special Concern in the Louisiana Coastal Zone - 90% completed.
3) Began status surveys for two plants that are candidates for federal listing by the U.S. Fish and Wildlife Service.
4) Began reviewing U.S. Forest Service compartment prescriptions for sensitive species management recommendations.
5) Began botanical and invertebrate survey of remnant prairie in Kisatchie National Forest (KNF).
6) Completed extensive inventory of the Red-cockaded Woodpecker on 2 districts of KNF.
7) Served as technical advisors to the Louisiana Nature Conservancy, Scenic Stream Task Force, Wetlands Priority Conservation Plan, and Project Wildflower.

RESOURCE MANAGEMENT

The Fur and Refuge Division has the responsibility of managing the fur and alligator resources of the state. The division's overall goal is to maintain or improve the resource while allowing optimum utilization.

Fur and Refuge Division personnel continued the monitoring program on the statewide harvest of alligators. During the 1987 season approximately 24,500 tags were issued to 1,334 commercial hunters statewide. These hunters took approximately 23,250 alligators with an estimate value of $6,580,000. Skins were sold primarily to foreign markets in France, Japan, and Italy. Along with the sale of skins, alligator meat is processed and channeled into the restaurant trade as well as for home consumption. Over 500,000 pounds of alligator meat (deboned) were sold for human consumption during the 1987 season. Louisiana alligator farms produced approximately 5,000 alligator skins and about 30,000 pounds of deboned meat. Value of the meat at the retail level amounted to about 2.4 million dollars.

Suitable farming stock has severely limited the advancement of alligator farming operations in the United States. The Louisiana Department of Wildlife and Fisheries realized this situation and has provided stock from state-owned lands since 1977. Farmers that qualify for the program are given hatchling alligators annually until such time as their breeding stock is capable of producing the number of young desired to become a self-sustaining farm. Today, Louisiana has established 30 alligator farms statewide with about 41,000 alligators being housed on these farms. During the 1987 nesting season, approximately 20,000 eggs were hatched in Rockefeller Refuge incubators and these young animals were distributed to the 15 registered farms.

A total of 1,438,394 pelts were harvested during the 1986-87 trapping season yielding a net value of approximately $7.2 million. These figures represent a 387,000 increase in the number of pelts and a $2.6 million increase in value from the previous year. The vast majority of this change resulted from an increase in the number and value of the nutria and raccoon harvest.

Office of Coastal and Marine Resources

The Office of Coastal and Marine Resources is the Office within the Department of Wildlife and Fisheries charged with managing and regulating Louisiana's marine and estuarine fisheries within the framework and policy established by the Louisiana Legislature.

ADMINISTRATION

Program administration

The administrative section controls the fiscal, personnel and policy functions for the division as well as coordinating fisheries research, monitoring and management activities. The Office is administered by one of two assistant secretaries within the Department of Wildlife and Fisheries who reports directly to the Secretary. Functionally the Office consists of the Seafood Division, the Ecological Section and the Aviation Section. The activities of the office are presented in 6 major subprograms which address the major responsibilities of the office: Administration, Shrimp Management, Oyster Management, Finfish Management, Research, and Environmental Protection and Regulation.

Management liaison

In fulfilling its responsibilities the Office is required to interact with other governmental agencies, constituent groups, universities, etc. The Assistant Secretary represents the Department on the Gulf of Mexico Fishery Management Council, which develops fishery management plans for the resources of the federal Exclusive Economic Zone; other technical personnel of the office serve on various committees and working groups of the council. Several personnel are also involved in the activities of the Gulf States Marine Fisheries Commission, an interstate compact which promotes better utilization of the fisheries. The office works closely with the U.S. National Marine Fisheries Service, U.S. Fish and Wildlife Service, Environmental Protection Agency, Department of Energy, Food and Drug Administration, Louisiana Department of Natural Resources, Louisiana Department of Health and Human Resources, Louisiana Geological Survey, LSU's Coastal Fisheries Institute, and many other agencies in managing the coastal resources. Routine contact is maintained with most of the major user groups interested in the fisheries and environment.

Aviation

The Aviation Section plays a vital role in the enforcement of wildlife and fisheries laws and in research and management activities of the department. The vastness of Louisiana coastal wetlands, with over seven million acres south of the Intercoastal waterway much of which is not accessible by automobile, necessitates travel by air.

Reconnaissance flights greatly increase the effectiveness and efficiency of the department's enforcement activities. Specifically, these flights aid in the location of baited waterfowl ponds, illegal gill nets, purse seining activities, and shrimping and oyster harvesting from unapproved growing areas. Aircraft also play a support role in the apprehension of illegal night hunters and others suspected of violating wildlife and fisheries statutes.

Additionally, air support plays a significant role in many of the research and management activities of the department. Fall and winter waterfowl surveys, fishing effort surveys, oil spill investigations and habitat inspections conducted across Louisiana's marshes would be impossible without air support.

This section also assists during times of emergencies and has played a significant role in evacuating personnel from remote areas in times of natural disasters.

Permits

This subprogram also administers and issues permits to person engaged in various activities. During 1987, 114 Scientific Collecting permits were issued to scientists to collect marine and estuarine fish and invertebrates for research and education; 29 Special Bait Shrimp permits were issued in accordance with R. S. 56:497; no experimental permits were issued in accordance with R.S. 56:571; and 18 Pompano permits were issued in accordance with R.S. 56:406. The 1987 Legislature authorized the issuance of up to ten permits for mariculture operations; to-date seven of these permits have been issued.

SHRIMP MANAGEMENT

Shrimp Season

The brown shrimp season opened statewide on May 25, 1987. The number of recreational boats in Zone 1 was down by about 25-50% from previous years. Commercial effort in that area was about the same as previous years. Shrimp catches began to drop rapidly after the first week of the season.

There was no difficulty with 100+ count shrimp on the lower west side of the Mississippi River as in previous years. The shrimp were larger than expected and production was brisk but brief. A stable market provided fishermen with good prices, resulting in an overall satisfaction by the majority of dealers and shrimp fishermen. The brown shrimp season in Zone 1 closed July 14, 1987.

In Zone 2, water temperature was slightly below average during most of March, but then two closely spaced cold fronts the last week of March and the first week of April dramatically lowered temperatures. This adversely impacted the juvenile brown shrimp. However, May water temperatures were above average, and coupled with the high salinities, was conducive to growth and survival of late arriving postlarvae. Salinity remained high and water temperature was normal through the remainder of the year.

Shrimp CPUE increased in May prior to the season opening, but did not suggest anything but an average year.

Commercial catches in Timbalier-Terrebonne Bay on opening day, coupled with high opening day prices, were very good; trawl catches obviously declined thereafter. Overall, wingnetters did not land large amounts of shrimp, as the season opened after the May full moon and thereafter the tidal cycle and moon phase were not synchronized. A second wave of brown shrimp began appearing in commercial catches; small shrimp (80-100's, >100's) began to dominate the commercial catch by the first week of June in the marsh and fringe areas.

Salinities in western Terrebonne Parish dropped drastically during the month of June as a result of heavy rainfalls (15 inches) which occurred early in June. The heavy rains had little effect on the Atchafalaya River, which can influence the western portion of the Parish, but did result in a large amount of runoff which dropped the salinities from as high as 14 parts per thousand (ppt) at the beginning of June to a low of 6 ppt by the end of June. Salinities began to recover by mid July.

Large numbers of juvenile white shrimp began showing up in the central Zone 2 in the last week in June. The portion of Zone 2 east of the Atchafalaya River was closed at 8:00 p.m. Wednesday, July 1, 1987 except for the larger bays which included Terrebonne Bay, Timbalier Bay, Lake Barre, Lake Raccourci, Lake Pelto, and Barataria Bay, as well as that portion of Zone 2 west of the Atchafalaya River. These bays and the region of Zone 2 west of the Atchafalaya River did not close until 6:00 p.m. Tuesday, July 4, 1987.

The white shrimp season opened on August 17, 1987. Both commercial and recreational effort in Lake Pontchartrain-Lake Borgne in Zone 1 was very reduced. This was because the larger concentrations of shrimp were west of the Mississippi River. Lake Pontchartrain produced consistently good catches throughout the season. Based on the Lake Pontchartrain production a special season extension was granted east of the river from December 22, 1987 until January 15, 1988. Catches during this period remained good until the first cold front on January 1 and 2, 1988. After the passage of that front catches dropped drastically.

A general historical trend continued in Zone 3; brown shrimp seldom reach marketable size by the opening of date May 25 due to late recruitment. Success of the brown shrimp season can only be described as poor. This was the second year in a row that poor success was experienced in this area. However, the most successful portion of the season was in late June and July. The season went the full term and the season remained opened to wing nets only on outgoing tides until 6:00 a.m. July 28. The Calcasieu Ship Channel from Nine Mile cut or channel marker 66 to the Gulf of Mexico and East Pass from its origin at the Calcasieu Ship Channel to the South end of Calcasieu Lake and also West Pass from its origin at the Calcasieu Ship Channel to the South end of West Cove was the area where wing netting was permitted.

A strong migration of white shrimp from inshore waters to offshore occurred in Calcasieu Lake for the second consecutive year. Although not as complete as in 1986, a major portion of the shrimp population migrated beginning around August 6 and persisted until around August 12. A review of historical data revealed this trend has been occurring for several years, but success of opening day catch in the lake is related to crop abundance and at what point the decline in population occurs in relations to opening date.

The overall season was poor. For all practical purposes, shrimping in the lake proper was almost nil after opening day. The majority of the shrimp harvested for the remainder of the season were by butterfly boats fishing the channel mouths during frontal passages and by small boat channel trawlers. The best catches occurred during October.

Special Season

1. A special season between January 15 and February 1 was declared east of the Mississippi River in order to allow fishermen the opportunity to land "Seabobs" usually abundant during this time period. For the first time in a number of years, this area did not produce "Seabobs."
2. A special white shrimp season was held in Calcasieu Lake and that portion of the Calcasieu Ship Channel south of Channel Marker 91-92 for 72 hours from 6:00 a.m. May 5, 1987 to 6:00 a.m. May 8, 1987.

Effort for this special white shrimp season was 475 bay/sport boats and 105 commercial (large double rig) boats. Creel checks of bay boats yielded catches from 0-100 pounds heads-on, with an average of 23 pounds. Commercial boat harvest was estimated to be 200-500 pounds heads-on per boat opening day, 150 pounds second day and 100 pounds for third day catch. Butterfly shrimpers averaged 100 pounds (heads-on) for a 6-hour effort.

Total estimated harvest for both sport and commercial boats for the three day season was 60,809 pounds. This figure does not include a harvest estimate for bay/sport boats for days two and three of the season. Most of the boats from other parts returned to their home ports with their catch and also many small local boats sold directly to restaurants because of higher prices received than from the seafood dealers.

The overall conduct of the special season was excellent. Many large commercial boats from eastern state ports participated in the season. Ports other than local observed were Dulac, Houma, Theriot, New Orleans, Terrebonne and Delcambre. Fishermen response was favorable with 95 percent of the people interviewed pleased with the results of their efforts.

Shrimp harvested by all factions were of large size and therefore of high quality value. Size of the shrimp consisted primarily of three grades: 16-20's, 21-25's and 31-35's

No brown shrimp were reported or observed caught during the special season. Mean length of the brown shrimp in Calcasieu Lake for WW 18 (May 3-9, 1987) was 40.2 mm.

3. A special shrimp season was extended in Breton and Chandeleur Sound from July 15, 1987 until the opening of the white shrimp season. Catches during this period remained fairly constant at about 200-300 pounds per boat per day with an average count of 26-30. With no evidence of small white shrimp in the Breton and Chandeleur Sounds, these areas remained open between seasons.
4. The 1987 spring inshore shrimp season in Zone 2 east of the Atchafalaya River closed at 8:00 p.m. on Wednesday, July 1 except for the following areas: Terrebonne Bay, Timbalier Bay, Lake Barre, Lake Raccourci, and Lake Pelto. Zone 2 traditionally closes in early July to protect the small white shrimp which begin appearing in the estuaries. The larger lakes and bays were left open because very few small white shrimp were found and harvestable populations of brown shrimp were still present. These areas closed on Tuesday, July 14, at 6:00 a.m.

Commercial shrimping effort was fairly high in the first few days of the extension because of movement of commercial trawlers from closed areas. By the second week, however, effort was greatly reduced due to decreased catches, and primarily concentrated in Lakes Barre and Raccourci. The first few days of the special season the commercial shrimpers were doing fairly well, considering the time of the year; skiffs were bringing in 100-150 pounds of 26-30's and 36-40's brown shrimp; ice boats were bringing 1400-1600 pounds of brown shrimp. A few 60-65 count white shrimp were mixed in the catch. Commercial catches dropped off after July 5. The decreased catch of brown shrimp was reflected in catch/effort in our 16' samples — 56.2 the week of 6/29-7/3 to 31.8 the week of 7/6-10 to 26.3 the week of 7/13-17. Toward the end of the special season increased reports of small (>100 count) white shrimp were received from the Old Lady/Lake Raccouri area.

A total of 311,305 pounds (heads-off) brown shrimp and 29,037 pounds (heads-off) white shrimp were taken in inshore water in Terrebonne Parish in July. Except for July 1, all shrimp caught in inside waters would have been during the special season. An unknown quantity of shrimp from CSA IV was also landed in Lafourche Parish.

Compliance with the "lakes only" open areas was better than expected. However, this special season was controversial. Some trawlers and dealers would have liked additional areas open, whereas some indicated that all areas should have been closed. Despite this criticism, and the lower than expected harvests due to decreased abundance of brown shrimp, this special season was considered successful.

Territorial Sea

It has only been within the last few years that the Department has had the means to carry out offshore biological and environmental studies. The confinement of sampling to only inshore areas has been a problem as only conditions during a segment of the life history of many of Louisiana's important recreational and commercial species could be studied and assessed. The coupling of inshore with offshore data enables the Department to better understand and manage the marine resources by providing biological and environmental data throughout the life history of many species. Extensive offshore data are obtained from LOOP, DOE and SEAMAP projects.

The territorial sea outward to three miles closed for shrimping on January 15, 1987 and remained closed through April 15, 1987.

Catch of shrimp in both the spring and fall seasons by the commercial fleet trawling near the shore of the Gulf off Cameron was very poor. Most of the boats reported working hard to catch 100-200 pounds a day. The major fishery occurred in that portion of the ship channel that falls under offshore regulations. Most of the shrimp caught in this area were by butterfly boats. Catches were sporadic with best catches occurring in association with frontal passages in the latter part of the fall season.

The fall run of seabobs off Cameron did not occur in 1987. However, the was a significant population on the beach in the late summer months. Some seafood dealers reported purchasing up to 30,000 pounds of seabobs a day during this period.

Hydrological Monitoring

The monitoring and assessment programs include inshore and offshore sampling and analyses of biological and environmental parameters coastwide. These data are utilized in characterizing various areas of the coast from season to season and year to year; determining and documenting long and short term events and assessing the results; predicting the annual relative harvest success of important recreational and commercial species - particularly shrimp, menhaden and oysters; determining pollution sources and cause of fish kills; and the building of a long term data base for use by the Department as well as other agencies of the state and federal government, private companies and individuals for use in habitat evaluation, saltwater intrusion determinations, hypoxic monitoring, stock assessments, etc.

Since the late 1950's, the Department has maintained recorders along coastal Louisiana which are mounted on platforms in the wetlands. Parameters measured include wind, tide, salinity and water temperature. Recorder measurements are made approximately once each hour. These data are augmented by rainfall, river discharge and air temperature information provided by the U.S. Corps of Engineers and NOAA. For over 25 years these data have been used in the annual prediction of the relative success of the brown shrimp harvest. Within recent years, these data, particularly salinity and water temperature, are used for assessing oyster and menhaden production.

The use of hydrological parameters enables the Department to determine the suitability of environmental conditions for a particular species. The 1987 brown shrimp season demonstrated the importance of these parameters in assessing the forthcoming harvest. Although severe cold fronts impacted the coast during late March and early April of 1987 and very few juvenile brown shrimp were found in the bays, salinities remained favorable for shrimp, and water temperatures after April 11 warmed to above 20°C. The resulting brown shrimp harvest was one of the higher harvest years in Louisiana.

In addition to the predictive value of these data, the long term data base is used to determine, after the fact, causes of events which impact fisheries.

In 1987, due to budgetary restrictions, the section reduced the number of hydrological monitoring stations. Key stations were maintained in Coastal Study Areas II, III (2 stations) and V. The section obtained solid state memory environmental data recorders and installed them at the four continuous monitoring stations.

The section's long-term salinity records were analyzed by researchers at LSU Center for Wetland Resources. Results did not show any significant long-term trends in salinities.

As part of an ongoing LSU Board of Regents project, recorder data is being re-analyzed using PC software written by a LSU Coastal Fisheries Institute researcher. These programs will be turned over to the section when they are completed and tested and should allow faster analysis of recorder data.

Offshore water column hydrologic profiling was continued during 1987. These data showed that hypoxic conditions were not as extensive and were of a shorter duration than conditions in 1981-1986. Low Mississippi River discharge, an unusual cold front passage in July and early onset of winter conditions along the coast reduced stratification and contributed to the reduced extent of hypoxic waters.

During 1987, efforts were continued to contribute marine fisheries-related scientific data collected coastwide to a set of master data files maintained on the department's mainframe computer. This marked the second year in a row that such data was entered in the field by the investigators themselves employing an interrogative data entry procedure developed inhouse for the network of mircro-computers now in place throughout the installations of the office. Considerable efforts were directed in 1987 toward enhancing the quality of the master data files. Data sets were provided to researchers from other government agencies, research entities within institutions, and private industry.

Blue Crabs

Unlike the shrimp fishery, which has special seasons and a flexible opening date for the May inside season, and the oyster fishery, which had access to public seed grounds and reefs and wherein fishermen must lease the oyster grounds from the Department, the crab fishery operates virtually on its own. Management of the blue crab fishery is essentially by regulations only.

The Department's involvement with the blue crab fishery consists of monitoring of blue crabs in shrimp samples, several research projects, and extension work. Technical assistance and literature is given to soft shell crab shedders, stone crab fishermen, etc. Department personnel have also worked with several organized crab fishermen groups (Concerned Crabbers of Terrebonne, Lafourche Crab Fishermen Association).

There are several major problems which may eventually require management measures, such as the possession of undersize crabs, trap theft and running of crab traps, and conflict over space with other crabbers and trawlers. The use of escape rings will substantially reduce the sublegal catch. The Lafourche Crab Fishermen Association is drafting a bill for mandatory float requirements and identifications. Conflict over fishing space has increased due to the sharp increase in number of commercial crabbers; in the 1980's the number of commercial fishermen increased by over 200%.

The general concept of escape rings and self-culling crab traps is a potential management measure for the following reasons: (1) culling time of commercial crabbers may be reduced by up to 75-80%; (2) fewer sublegal crabs will be delivered to the crab processor who cannot profitably handle them; (3) law enforcement problems associated with the possession of sublegal blue crabs will be reduced; (4) injuries to sublegal crabs will be reduced if they are allowed to escape; (5) traps with 2-3/8" rings have an increased legal catch; and (6) escape rings in traps will reduce the mortality in abandoned or lost traps. However, escape rings should not be made mandatory until the total impact of escape rings on peeler crab catches is evaluated. The primary source of pre-molt crabs for soft shell operations is from hard crab pots.

OYSTER MANAGEMENT

Management

After extensive review of the data obtained from the public reef surveys discussed later, particularly the numerous meter square samples, three major recommendations were made. These were presented to the oyster groups; the Louisiana Oyster Dealers and Growers Association, the Plaquemines Oyster Association, and to various members of the industry present at the "Day In the Bay" review of the grounds. All the comments and discussions were taken into consideration, particularly those presented to the Commission at the August 1987 meeting, and the following seasons were adopted:

1. The oyster season in Calcasieu Lake and Sabine Lake opened for tonging only, one half hour before sunrise on Monday, November 9, 1987 and extended until one half hour after sunset Saturday, March 29, 1988.
2. The oyster season on all public grounds east of the Mississippi River Gulf Outlet opened for sacking only, one half hour before sunrise on October 5, 1987.
3. All remaining public oyster seed grounds east of the Mississippi River, except the Bay Gardene Oyster Seed Reservation, opened one half hour before sunrise September 9, 1987.
4. The oyster season in the Hackberry Bay and Bay Junop Oyster Seed Reservations opened one half hour before sunrise September 9, 1987.
5. The oyster season in the Vermilion Bay Oyster Seed Reservation opened, for bedding only, one half hour before sunrise on September 9, 1987.
6. The Bay Gardene Oyster Seed Reservation and the Sister Lake Oyster Seed Reservation remained closed during the 1987/88 oyster season.

The Secretary was given the power to close the season prior to the set closing dates after giving 72 hours notice of biological information indicated the need for closure.

Because the June, 1987 oyster surveys of the "Public Oyster Seed Grounds" revealed a very limited supply of oysters available on the grounds east of the Mississippi River, and the vast majority of fishing for seed oyster had already taken place on the "Public Oyster Seed Grounds" east of the Mississippi River, in August the Louisiana Wildlife and Fisheries Commission reimposed the size limitation of 3 inches and no more than 5% shell in the cargo lot for the commercial sale of oysters fished from the public grounds. The 3 inch size limitation and the 5% shell restriction also applied to the bedding of oysters only on the Public Grounds east of the Mississippi River for the remainder of the 87-88 oyster season. The area on the "Public Grounds" east of the Mississippi River, Plaquemines Parish, commonly known as the Bay Crabe area, was closed to oyster fishing for the remainder of the 87-88 oyster season.

Health Department Closures/Activities

There were several activities associated with either Health Department Closures or the other efforts associated with health aspects of harvesting of shellfish, particularly oysters. A "Conditionally Managed Area" was created in the Calcasieu Lake system. This was critical since the area would not have been opened to oyster harvesting due to water quality results. The factor causing the water quality deterioration had to be isolated, and a management plan for safe harvesting developed around that condition. A rather lengthy management plan had to be formulated and presented to the Federal Food and Drug Administration for final acceptance. This resulted in the safe harvest of approximately 40,000 sacks of oysters that otherwise would not have been allowed to enter commerce. The commercial value of this to the fishermen who have been receiving an average of $16.00 a sack was about $640,000 dollars at dockside. Another conditionally managed area was created at "Sandy Point", Plaquemines Parish. This was also an area that was closed; our efforts resulted in the safe harvesting of several thousand sacks of oysters. In both cases the subprogram provided the motivation and technical knowledge to place these two areas into production.

There were some rather substantial oyster resources available in 2 areas of the public seed grounds which were closed to oyster fishing for health reasons; these were the Vermilion Bay Area/Cypremort Point and Bay Junop Seed Reservation. These areas have been closed because the water quality was not meeting the federal standards. It was felt that with restrictions and close scrutiny oyster fishermen could be allowed to move these oysters from the polluted areas and bed them on their leases.

The applicant first obtained the permit from the Department of Health and Human Resources and provided a bond to secure his satisfactory performance. The permits were widely circulated to all regulatory officials. Once the move officially began, fishing vessels had to check in with the Wildlife and Fisheries' vessel on location before fishing and before leaving the fishing area. The 65 ft. Department of Wildlife and Fisheries patrol vessel "Delta Tide" was utilized continuously during the Vermilion Bay move.

Once the fishing vessel cleared the fishing grounds enroute to the fishing vessel cleared the fishing grounds enroute to the lease upon which he would deposit the oysters, that vessel was advised of a series of V.H.F. radio check-in times and the facility and person to contact at the area of deposition. Again the Bay Junop situation was a little different since they were relaying to the same general area. The lease they were to move to was to be red flagged with flagging material provided by the Department. The vast majority of the oysters from the Vermilion Bay move would not be ready to harvest for 6 to 8 months. The Bay Junop move involved only leased areas that were closed until the March-April line went into effect.

A total of 14,285 barrels of oysters were moved during the relaying. This was approximately 28,570 sacks; however, during the bedding operations these fishermen generally expected to get at least a 1 to 1 return and, more likely, a 2 to 1 return upon harvest. Thus, we expect 57,140 sacks returned from the bedding operations. At the current price of $20.00 per sack a return to the fishermen of approximately $1,142,800 could be realized from the operations.

The Louisiana Department of Wildlife and Fisheries has invested some 950 manhours in the Vermilion Bay move and approximately 300 hours in the Bay Junop move. Total cost for the operation amounted to approximately $14,000.00.

Another "Action Plan" was completed in response to the Federal Food and Drug Administration Annual Evaluation of the health aspects of the State's shellfish program, and successfully defended at the Interstate Shellfish Sanitation Conference in Austin, Texas. In addition, at this conference Louisiana's vote was shared with Health Department and was conference Louisiana's vote was shared with Health Department and was cast on 135 key issues affecting Louisiana oyster industry.

The Section was also responsible for putting out 4 sets of closure maps at the prescribed posting site locations at an estimated cost of $4,000.00 to the Department in paper and manpower and maintaining contact with the regulatory health officials and the oyster industry in a series of bi-monthly meetings and "Oyster Task Force" meetings.

Public Oyster Seed Grounds and Reservations

Salinity is the prime factor determining oyster production on Louisiana's public oyster seed grounds and reservations. Low rainfall and/or low river discharge during 1985, 1986 and 1987 were responsible for extremely high salinities throughout the coastal area. As a result, unfavorable salinity conditions existed over those portions of the public grounds which typically produced the bulk of the public seed oyster and market oyster crop. However, in some typically unproductive areas, the higher than normal salinities resulted in unusually high levels of production.

In the usually productive areas, specifically east of the Mississippi River in Plaquemines Parish, oyster density sampling in 1986 and 1987 indicated the availability of seed oysters on only 2,000 of the 13,000 acres of reef. It is projected that the 1987-88 seed production from this area will be less than 50,000 barrels, represently a decrease of 50% from the average of the previous four seasons. Likewise, market oyster production from this area for 1987-88 is predicted to be only 32,000 sacks — a decrease of 85%.

In the Atchafalaya-Vermilion Bay area, which is a typically unproductive portion of the public grounds due to the overwhelming influence of the Atachafalaya River, oyster production increased dramatically in response to the drought conditions and the higher than normal salinities. This portion of the public grounds, from which essentially no production was recorded from 1979 through 1985, is predicted to produce 100,000 barrels of seed and 250,000 sacks of market oysters during the 1987-88 season.

The high levels of production from the Atchafalaya-Vermilion Bay area, however, did not completely offset the decline in production east of the Mississippi. Production from public grounds in CSA 1 was negligible and the combined total from the Hackberry and Bay Junop reservations was a modest 3,500 barrels of seed and 16,000 sacks of market oysters. In addition, the Sister Lake reservation remained closed during the 1987-88 season and the Calcasieu Lake tonging area was heavily impacted by DHHR closures.

For these reasons, overall production from the public oyster seed grounds and reservations for the 1987-88 season was poor. Total predicted production of 150,000 barrels of seed and 340,000 sacks represented a decline of 35% and 53%, respectively, from the average of the previous five seasons.

Public seed grounds opened east of the Mississippi River Gulf Outlet (MRGO) on October 5, 1987. On opening day there were less than ten boats throughout the area which harvested less than 5 sacks per boat per day. Catches throughout the season never increased.

The season west of the MRGO and east of the Mississippi River opened on September 9, 1987 with 134 boats fishing. Sixty-three boats were bedding, while 71 boats were sacking. Production quickly dropped after the first week with most of the oystermen returning to privately leased grounds.

The only areas to produce any quantity of oysters were the 1986 shellplants in Black Bay and Bel la Pass, together with two additional areas at Mangrove Point and Sunrise Point, areas occasionally fed by freshwater from Bayou Lamoque and from the Cox Bay-Fucid Bayou areas respectively.

The Sister Lake Oyster Seed Grounds opened on March 1 and remained open until April 1. A total of 26,173 sacks and 3,362 barrels of oysters were harvested. The combined total for the Sister Lake 1986-87 season resulted in 71,182 barrels of oysters harvested from the Sister Lake Oyster Seed Grounds.

The Sister Lake Seed Grounds were not affected by the Louisiana State Board of Health pollution line closures until the November closures went in affect. At that time, most of the northern and eastern portions of Sister Lake were closed to oyster harvesting. The pollution line maps issued in march kept most of the northern portion of the seed grounds closed but reopened most of the eastern half of the lake.

The Bay Junop Oyster Seed Grounds opened Wednesday, September 9, 1987 for the harvest of sack and seed oysters. Opening day, 63 boats took 1,825 sacks and 510 barrels of seed oysters from Bay Junop. The northern half of Bay Junop was closed to oysters harvesting by the Louisiana State Board of Health pollution line which ran across the middle of the Bay and closed the entire northern portion of the estuary.

When the new set of pollution line maps were issued at the end of October, Bay Junop was closed to oyster harvesting entirely. The special five-day season in Bay Junop November 16-20, 1987 for the purpose of transplanting oysters by special permit from the Board of Health has been discussed earlier. Five permits were issued to individuals wishing to transplant oysters, however, only three participated in the transplanting process. Five boats transplanted 2,535 barrels of oysters during the five-day period. This brought the total harvest for 1987 from Bay Junop to 7,391 barrels combined sack and seed.

High salinities throughout 1986 in the southern portion of the estuary resulted in a high mortality of oysters in this region due to increased predation by oyster drills, drum fish, stone crabs, and other high salinity associated maladies which affect oysters. This increased mortality in the southern portion of the estuary combined with the pollution line closures in the northern part of the estuary restricted oyster production to the mid portion of the estuary and concentrated effort in this region of the Bay Junop Seed Grounds as well. Although salinities moderated somewhat in 1987, they remained above 15 ppt in the southern portion of the estuary for eight out of the twelve months of 1987 bringing little relief from oyster drill and other predatory activity in this region.

The Sister Lake Oyster Seed Grounds remained closed in the fall season as was the case with the alternating year system of opening and closing the state seed grounds. The Sister Lake Seed Grounds situated in the mid portion of the estuary was spared the mortalities experienced in the Southern portion of the Bay Junop Seed Grounds. Although some mortalities from high salinity predators has occurred in the southern portion of Sister Lake, it was not to the extent of that which has occurred in the southern region of the estuary.

Water conditions in the Vermilion Bay area were excellent for oyster production. Square meter samples taken at various stations around the newly defined seed ground indicated very good concentrations of both sack and bedding oysters. Past water quality samples taken by DHHR required closure of parts of the seed ground completely, and allowed opening other sections whenever the Atchafalaya River at Krotz Springs was below a 12.0 foot river state. A very large concentration of seed oysters 3 inches or less was discovered off Cypremort Point on the Dry Reef area, a closed area, and were moved to private leases as previously discussed.

Oyster Complaint

Oyster complaints east of the Mississippi River were down from previous years. A report pertaining to wheelwashing was completed in 1987. This report covered eight oyster leases with sampling before and after the operation in order to carefully document the effects of wheelwashing on nearby shellfish beds.

An oyster complaint in Bay Adams at Meyers Canal was investigated. This was physical damage due to a tug running aground on an oyster lease.

Two oyster complaints were worked in Terrebonne Parish during 1987. Both complaints involved tugs with barges running aground on leases in the study area.

Only one oyster complaint was worked in Calcasieu Lake in 1987. A barge was stuck in West Cove of Calcasieu Lake, and marsh buggy vehicles were tracking in the lake bottom proper and mashing live oysters into the mud. A shell plant of 500 cubic yards was placed in the lake to mitigate damages. This shell plant created a new reef of approximately 5 acres. On September 9, 1987 the reef was sampled and it was determined that oyster spat had begun to set on the new shell plant.

Survey Section Activities

During 1987, $187,253.80 in survey fees were collected, $568,810.33 in rentals were collected, and 440 leases were issued and processed. Field activity included scheduling 1285 applications for survey, and surveying 669 applications. 613 applications could not be surveyed due to bad weather conditions and low tide.

The Survey Section held its first delinquent oyster lease auction on March 31; 117 leases containing 5964 acres were auctioned for $56,933.74. A limited lifting of the oyster lease moratorium occurred during which 300 applications for new area were taken. The Survey Section also completed the construction survey at Quail Drive and a survey of a portion of the boundary of the Atchafalaya Wildlife Management Area.

Tags

Approximately 1.9 million oyster tags were sold in 1987.

Shell Plants

An application was made to the Federal Government for Disaster Assistant in the sum of $2,000,000. If granted, these funds would be used to plant shell in suitable areas to provide spat for the industry.

Oyster Transplant

On May 18, 1987 Department personnel accompanied a local fisherman in an effort to determine if an oyster transplant from Lake Pontchartrain was feasible. The only live oysters found were in the area of Seabrook

Bridge at the Interharbor Navigational Canal. It was determined that there was only about 9 to 13 acres of oyster available. It was decided that such a small amount of oysters would not justify a transplant.

FINFISH MANAGEMENT

Redfish and Speckled Trout

Finfish samples are collected on a standardized basis throughout Louisiana's coastal estuarine system. Various gear types are utilized to gather information to better manage the state's renewable fisheries. Experimental gill nets composed of five different mesh sizes are used to evaluate and track year class strength and seasonal distribution. Trammel net samples aid in determining relative annual abundance and contribute to our knowledge of the basic life history of many species. The third gear used is a small mesh bag seine. This gear samples estuarine dependent young-of-the-year fish most often found in shallow marsh habitat. Hydrologic conditions are acquired at all sample locations in order that we might identify preferred salinity and temperature regimes of various fish species. In all, samples collected are designed to gather concise and timely information to base recommended management decisions to protect or enhance Louisiana's renewable natural finfish resources.

A milestone in management of finfish was realized during the 1987 regular session of the Louisiana legislature. A package of recommendations was developed regarding spotted seatrout and red drum. These recommendations were designed to reduce harvest of those fish from Louisiana waters. Cooperative efforts between Department personnel, Louisiana State University CFI personnel, NMFS, GSMFC, SEFC, and GMFMC provided data indicating that overfishing has and is occurring in Louisiana waters. Because of this, offshore spawning stocks have declined to potentially dangerous levels. In order to restore those stocks, escapement from inshore waters must increase.

Recommendations to initiate a quota on commercial fishermen, adopt minimum mesh sizes, increase minimum sizes, and prevent filleting at sea were approved by the legislature. Recreational fishermen were also affected by the filleting prohibition and adoption of minimum sizes. Recommendations to reduce the creel limit and suggested sizes were not implemented. With compliance, these management techniques should enhance the finfish stocks in Louisiana and offshore waters.

Menhaden

In addition to opening and closing the shrimp seasons, information from the trawl samples is used each year to develop a forecast for menhaden production. Meetings are held every year with menhaden industry personnel prior to the opening of the menhaden season to present catch forecasts and to discuss other matters relative to the menhaden industry. This year's meeting was held February 24 and 25, 1987 at the Wildlife and Fisheries Marine Lab at Grand Isle.

Models for predicting commercial catches of gulf menhaden have been developed by department biologists. These predictive models are based on abundance of juvenile menhaden taken in the shrimp monitoring trawl samples the previous year and on hydrological and climatological data such as salinity, temperature, river discharge, wind direction, and tides, also from the previous year. Catch-per-effort of age-1 menhaden is predicted. Since age-1 menhaden comprise 90% and 67% of the catch in western and central Louisiana, respectively, the age-1 forecast also reflects on total catch.

In addition, optimum hydrological/climatological conditions have been identified for the critical early life history stages, which occur from December to March. Relatively cold, dry winters are associated with good recruitment of age-1 menhaden into the fishery the following year. The cold, dry winter is characterized not only by low temperatures and low rainfall but also by low tide levels, low Mississippi River discharge, high salinity, low wind speeds, and low incidence of southeast winds.

The 1987 forecast was for an average age-1 year class and an overall below average catch. The 1987 menhaden landings in the Gulf of Mexico were approximately 5% greater than in 1986, but slightly less than the five year average (1982-86). However, the last five years have been above average when compared to historic landings.

Billfish

Game fish status was declared for most billfish, prohibiting the commercial sale of those fish in Louisiana.

Eel

The legislature adopted provisions allowing changes in the construction and dimensions of an eel trap, which permitted fishermen to more efficiently harvest the resource. Although this fishery remains in infantile stages, the potential for growth is tremendous.

Fish Kills

Reports were received in early 1987 relative to a fish kill near the Chandeleur Island area. The report stated that several thousand red drum had been observed floating, and aerial photos were broadcast by a local television station during a weeknight news program. Subsequent investigations documented that three red drum, several black drum, several striped mullet and some gafftopsail catfish were dead. No cause was documented. Several seismograph boats were or had recently been operating in this area, and speculation was that these fish had been killed by the charges used during the survey operations.

Other than this erroneous report, no fish kills were observed or documented during CY87.

Artificial Reefs

The Louisiana Artificial Reef Initiative, comprised of state, federal, university, recreational, commercial fishery, and private industry interests was formed in 1985 to promote the "rigs to reefs" (i.e. the use of abandoned offshore oil platforms as artificial reefs) movement in the Gulf of Mexico off Louisiana and to develop an artificial reef program in Louisiana. It has been reported that 350 structures have already been removed from Louisiana's coastline, and estimated that, by the year 2000, 40% (1,625) of the oil and gas structures in the Gulf of Mexico today would have been removed. These structures provide an important habitat for fish and good fishing for Louisiana fishermen. Unfortunately, it is the popular fishing platforms within 25 miles of shore that have the shortest remaining life expectancy. The Artificial Reef Initiative was designed to convert some of these platforms into artificial reefs.

The Louisiana Artificial Reef Plan was submitted to the Louisiana House and Senate Natural Resources Committees in the spring of 1987. This plan contains the rationale and guidelines for the implementation and maintenance of a state artificial reef plan and provides for eight artificial reef sites off the coast of Louisiana. The program is to be funded through donations from the oil companies on a portion of the savings realized from donating a structure to the state rather than hauling it onshore as presently required by law.

One oil and gas structure has already been donated for use as an artificial reef. This structure, owned by Cities Service, was located in South Marsh Island Block 186, 90 miles south of Marsh Island. This structure was located within one of the artificial reef sites, and was merely toppled over at its present location. A total of $250,000 (approximately half of the savings realized by Cities Service by not having to transport the structure onshore) was donated to the Louisiana Artificial Reef Development Fund.

Negotiations are now underway with five companies to donate soon-to-be dismantled oil platforms to the artificial reef program.

RESEARCH

Lyle S. St. Amant Marine Laboratory

The primary function of the Lyle S. St. Amant Marine Laboratory is to conduct applied research for the betterment of Louisiana's seafood resources and industries. Problem specific studies as well as extensive monitoring programs are conducted by the research staff who interpret the data and make recommendations concerning management alternatives. Major accomplishments and projects undertaken in 1987 are listed below by topic.

Shrimp

Since 1981, inshore brown shrimp populations in the Barataria Bay system have been sampled intensively before and after the opening day of the inshore season. This intensive sampling scheme is now used on an annual basis in Coastal Study Area III to evaluate the efficiency of the inshore fleet and to determine the success of the opening date with respect to the 100 count/pound criteria. In 1987, approximately 48% of the inshore brown shrimp population was 100 count or larger on opening day (May 25). The efficiency of the fleet was comparable to that observed in previous years with the marketable inshore population decreasing (in weight) by 84% during the first week of the season.

These methods of assessing the season's opening were expanded in 1987 to include all seven Coastal Study Areas (CSA's). The percentage of the inshore brown shrimp population 100 count or larger on opening day ranged from a high of 56% in CSA II to a low of 4% in both CSA VI and CSA VII. The percent decrease in the marketable inshore population during the first week of the season was comparable in all Coastal Study Areas, ranging from 75% to 87%.

In other studies, laboratory researchers have continued to analyze historical data sets generated by the Seafood Division's coastwide shrimp monitoring program. One such analysis involved determining the relationship between juvenile abundance, as measured by the Division's inshore trawl samples during the month of April, and annual NMFS shrimp catch statistics. A strong relationship was found to exist and was used in predicting brown shrimp catch in 1987.

Monitoring of an extensive shrimp farming operation in Lafourche Parish was continued in 1987. The purpose of the monitoring program is to determine the potential for, and the problems associated with, such operations in coastal Louisiana.

Oysters

In 1987, using a predictive model developed at the Laboratory, a forecast was made of seed oyster availability during 1988 on the primary seed grounds east of the river. Over the past five years these forecasts have proven reliable and have served as a basis for management recommendations concerning the seed grounds. Unfortunately, seed production on the primary grounds in 1988 is predicted to be no better than the poor production observed in 1987.

A survey of the Public Oyster Grounds in Atchafalaya and Vermilion Bays was conducted by Marine Lab researchers in June, 1987. From the high oyster densities and the vast reef areas observed, it was projected that full utilization of this resource could partially offset the poor production on the primary grounds east of the river.

Using data provided by the Louisiana Department of

Health and Human Resources and the U.S. Army Corps of Engineers, Lab researchers identified relationships between Mississippi river stage and fecal coliform levels in the Sandy Point-Bay Jacques area in Plaquemines Parish; and, between Calcasieu River stage and coliform levels in Calcasieu Lake. These findings have enabled DHHR to conditionally manage these important oyster producing areas.

At the request of oyster lease holders, Marine Lab personnel conducted 11 lease investigations in 1987 — three of which were associated with maintenance dredging of the Barataria Waterway.

A survey of oyster mortalities was conducted following a period of prolonged low salinities in June 1987. The mortalities were essentially limited to Little Lake, upper Grand Bayou and Bayou St. Denis.

Finfish

Sampling continued for a fifth year in a study to determine environmental parameters influencing distribution and abundance of young-of-the-year (YOY) spotted seatrout and red drum. Analyses to date indicate that salinity is the prime determining factor of year-class strength for both species. For spotted seatrout, there is a direct relationship between year-class strength and salinity during September and October. A direct relationship also exists between red drum year-class strength and October-November salinities.

In 1987 a king mackerel tagging project continued in conjunction with the National Marine Fisheries Service. A total of 349 mackerel were tagged and 227 tissue samples collected.

Crabs

A study was continued in 1987 to determine the annual variability in blue crab populations in the Barataria Bay system. Historical trawl data and constant recorder information from Coastal Study Area III is being used in the analyses. An inverse relationship has been found to exist between blue crab catch-per-unit-effort and springtime salinities.

Freshwater Diversion

Marine Laboratory scientists continued to work in close cooperation with the Louisiana Department of Natural Resources and the U.S. Army Corps of Engineers to bring about large-scale controlled freshwater diversion from the Mississippi River into coastal Louisiana.

Since freshwater diversion is perhaps the most effective way to address coastal deterioration and enhance estuarine productivity, facilitating such projects has been given top priority at the Marine Laboratory.

Cooperative Studies

In 1987, a cooperative study was continued between Marine Laboratory scientists and LSU researchers. Such arrangements are mutually beneficial and allow for more complete utilization of the laboratory's facilities.

The purpose of this ongoing study is to determine the feasibility of, and the problems associated with, pond culture of red drum. The work is being conducted in the research ponds on the Marine Laboratory grounds.

Shrimp Tagging

During 1987 a shrimp mark-recapture study began east of the Mississippi River. During that time 8,000 juvenile shrimp were tagged and released in the Lake Borgne area, and 8,000 were tagged and released in the Oak River-Bay Gardene area. During the study approximately 425 shrimp were returned by fishermen. Most of the returns from shrimp tagged in the Lake Borgne area demonstrated little or no movement; those from the Bay Gardene area generally moved toward the Gulf of Mexico. Data from tag returns is presently being compiled into a completion report on the project.

Shrimp Cage

During July and August, 1987, CSA I personnel conducted several investigations of a Trawl Shrimp Cage. This device is constructed in such a method so as to allow wingnetters to release their bycatch with minimum mortality occurring. The device is mounted at the stern of a boat and the catch from the wingnet is directed into the cage so that the shrimp can be removed by dipping with a small net and immediately releasing all bycatch. Preliminary results of these investigations showed that while the device worked on small boats, its value for larger vessels is questionable.

Sea Turtles

During the summer of 1987 a project proposal was submitted and approved for MARFIN funds to conduct a sea turtle stranding study in Louisiana along 6 study areas west of the Mississippi River and east of the Mermentau River. Each study location was visited twice monthly beginning in October, 1987. During the period from October through December remains of 15 turtles were found; three of the study areas reported finding at least one and three reported no turtle remains. A quarterly report was submitted in Jaunary 1988 detailing these findings.

MOSS

A habitat quantification project, using the U.S. Fish and Wildlife Service's MOSS geographic information system was completed early in the year. Results of the project showed a correlation between total annual coastwide brown shrimp harvest and total suitable habitat acreage (calculated from recorder data) in Barataria Basin ($R = 0.90$).

ENVIRONMENTAL PROTECTION AND REGULATIONS

Louisiana continues to lose valuable fish and wildlife habitat to development projects of various agencies of federal, state and local government and to projects of private enterprises. Federal, state and local laws and procedures allow the Louisiana Department of Wildlife and Fisheries to review projects and evaluate the probable effects of the projects on fish and wildlife resources. The Department is charged by the Louisiana Constitution "to protect, conserve and replenish the natural resources of the state, the wildlife of the state, . . .," and is, therefore, the appropriate state agency to investigate and assess the fish and wildlife resources of different portions of the state.

Our objective is to gather and compile data on the fish and wildlife resources, their potential and their needs in the area of project influence and to provide technical assistance by making information obtained available to project planners and sponsors. Fish and wildlife information is essential to sound planning of land and water management projects and to proper decision making in various government programs.

Environmental Investigations

The United States Army Corps of Engineers both as a construction agency and a permitting agency has a need for fish and wildlife resource data from specific areas. The Corps is the principal agency promoting navigation and flood control projects in the state and its activities nearly always pose a serious threat to fish and wildlife. Further, the Corps is the permitting authority for projects in wetlands and adjacent waters of the United States.

At least two agencies of the United States Department of Agriculture: the Soil and Conservation Service and the U.S. Forest Service, are required to review their projects in light of possible effects that they may have on fish and wildlife resources. They frequently need fish and wildlife data in their project decision making.

A number of other agencies such as the Federal Highway Administration, Environmental Protection Agency, Federal Aviation Authority, Farmers Home Administration, Housing and Urban Development, Louisiana Department of Transportation and Development, Louisiana Department of Environmental Quality, and the Louisiana Department of Culture, Recreation and Tourism often have need of fish and wildlife information for use in planning and decision making. Additionally, private developers and consultants who wish to apply for permits through some of the above regulatory bodies are required to secure certain environmental information in order to comply with the permitting requirements. The Louisiana Department of Wildlife and Fisheries is the appropriate source of this information.

Some of the major projects investigated during FY 87 were: Freshwater diversion projects, Hurricane Protection Levee projects, navigation projects, marsh management plans, airport construction, Community Development Block Grant projects, Farmers Home Administration Projects, Statewide Flood Control Projects, Solid Waste Disposal Permits, Hazardous Waste Disposal Permits, Hydropower projects, other types of dam projects, coastal erosion and restoration projects, several hundred 404 and Coastal Use Permit Applications, and numerous requests for information from both government and the private sector on matters related to fish and wildlife.

No intensive Scenic Rivers Surveys were conducted during 1987/88, however, section personnel, upon request surveyed a number of streams located in Vernon and Sabine parishes as candidates for designation as Natural and Scenic Rivers. Field trips, meetings and reviews of computer data bases were conducted to gather the physical, biological and land use information necessary for evaluations. From the initial group of potential candidates, six streams received favorable recommendations and were included by legislative action in the System. In addition, several reconnaissance surveys were carried out during the investigation of permit applications. Most other research was limited to literature searches. During FY87 the Ecological Studies Section reviewed 12 permit applications, issued 8 permits and rejected or revised 3.

The 1987 session of the Legislative adopted HCR 139 which established a task force within the Department of Wildlife and Fisheries to review the existing scenic rivers program and develop recommendations for administrative and legislative changes as may be required to improve the Department's scenic rivers management capabilities. The task force is composed of representatives of major users and landowner groups and state agencies which currently have responsibilities for reviewing and evaluating scenic river permit applications. During 1987/88 section personnel participated in regular meetings of the task force and its subcommittees, in task force sponsored activities, including a series of workshops held across the state to provide public input into the management planning process, and in interviews by the various news media. Section personnel are also responsible for preparation of the final task force report to the Legislature.

During FY87 the Ecological Studies Section reviewed and issued 7 fill material permits for removal of fill from the Mississippi River. Several Habitat Evaluation Field Trips were conducted during the FY in conjunction with major land modification projects.

As a result of new legislation from the 1987 session of the legislature, the section reviewed and issued 7 permits for the mariculture of Red Fish in coastal Louisiana. Five (5) permits were issued in Lafourche Parish, one (1) in St. Bernard, and one (1) in Terrebonne.

LOOP

The Department's Louisiana Offshore Oil Port monitoring project continued for its tenth year. Estuarine and offshore habitats in the vicinity of LOOP facilities and along the pipeline corridors were sampled regularly to determine whether or not environmental alternations are occurring due to LOOP activities.

Shrimp and bottomfish, zooplankton and benthic communities were sampled in conjunction with water and sediment samples for characterization of local habitat. Continuous records of water temperature, salinity, current velocity and tide level were also made. Periodic flights to inspect LOOP and ancillary pipeline corridors and facilities provided information on pipeline conditions. Plug repairs were requested throughout the area. LOOP operations (including oil transport, brine disposal and facility repairs) were monitored.

Department personnel continued oil spill and dispersant use contingency planning in conjunction with other state and federal agencies. An experimental dispersed oil tracking plan has been prepared and submitted for review. Portions of this plan will be included in the EPA/US COAST GUARD Region 6 "Oil and Hazardous Substances Pollution Contingency Plan" as part of the environmental monitoring appendix for chemically dispersed oil. The section monitored results of privately funded oil dispersant toxicity studies using static and flow-through methods with organisms native to coastal Louisiana, including: American Oyster (*Crassostrea virginica*), brown shrimp (*Penaeus aztecus*), white shrimp (*Penaeus setiferus*) and red drum (*Sciaenops ocellatus*).

DOE/CALECO

The Department's participation in the U.S. Department of Energy funded study of pollution loading and environmental characterization of the Calcasieu River/Lake system was completed during this, the fourth, year of the project. The Department provided administrative and technical review for the project, while field research was performed by McNeese State University. Additionally, a mathematical model of circulation and dispersion within the Calcasieu system was prepared by researchers from the University of South Carolina.

Field data collection was completed during 1986, and project activities during 1987 were primarily related to completion of the final project report. This report was delivered to the Department by MSU during June. During February 1987, an environmental problem was brought to light as a result of a dredging permit application for Bayou d'Inde in the Calcasieu Basin. This stream, which drains the major industrial area near Lake Charles, was found to have high concentrations of metals and organic pollutants in its bottom sediments. Data from this study were used to help identify the range and extent of pollutants in the area. The Department and MSU researchers cooperated with the Louisiana Departments of Environmental Quality and Health and Human Resources, Calcasieu Parish Health Unit, U.S. Geological Survey, and U.S. Environmental Protection Agency in a continuing effort to quantify the extent of environmental damage in Bayou d'Inde, and to identify measures to protect the public.

In general, the Calcasieu River system below the saltwater barrier at Lake Charles can be characterized as a complex coastal lagoon system in which winds, tides, and freshwater input contribute approximately equally to circulation and dispersion. Additionally, the Calcasieu ship channel serves as an avenue for intrusion of saltwater as well as contributing to a strong gravitational circulation within the system. Domestic and industrial pollutants are introduced in the northernmost areas of the system, and water quality problems indicated by depressed levels of dissolved oxygen have been recorded. Additional problems with contamination of sediments and animal tissues have been found, but these effects are limited to local areas. Biological communities vary within the estuary with hydrological conditions and, to a certain extent, with the degree of human impact at a particular location.

DOE/West Hackberry Brine Disposal

A U.S. Department of Energy grant was received for environmental assessment at the West Hackberry Strategic Petroleum Reserve (SPR) brine disposal site. The grant is intended to provide monitoring of the SPR brine discharge area in order to protect Louisiana's unique coastal environment from both short-term and long-term damage or harm which may occur due to brine discharge. LDWF will sample benthos, zooplankton, nekton, water and sediment quality and hydrographic parameters. Plans to initiate field work by mid-1987 were delayed due to delays in receipt of equipment from the previous DOE contractor and to the disrepair of much of the equipment. Necessary equipment was ordered and sampling should begin early in 1988.

Seismic

Seismographic exploration, the measuring of shock waves created by discharging an energy source, is the tool used by the oil and gas industry in its exploration activities to locate potential reserves. Research has indicated some seismographic activities may adversely impact the fish and wildlife resources of the state. In order to effectively monitor these activities, a regulatory process was established and is administered within the Seafood Division.

Seismic companies operating within the state must first obtain a permit from the Department. Seismic agents employed by the Department are assigned to each field operation and prepare weekly reports on the seismic companies' operations. These reports include information on the activities of the companies' survey crews, the discharge of explosives or other energy sources used to create the shock waves, and daily records on the number of charges fired, depth fired and impact on habitat and fish and wildlife resources.

In 1987 forty crews were permitted to work in the state. The Seismic Section increased the fees for seismic agents from $115.00 per day to $135.00 per day for days crew(s) work.

During the 70's and up to 1986, the Seismic Section operated in a normal manner; too many crews and not enough personnel.

Then oil prices dropped and the bottom fell out of the petroleum industry. The Seismic Section consisted of 27 seismic agents, 4 regional supervisors, 1 seismic operations supervisor and a secretary. Since this slowdown, this section now operates with 5 seismic inspectors, 2 regional inspections supervisors, 1 seismic inspections manager and one secretary. All other personnel have been laid off.

Since the slow down in work, the crew count has been from 2 crews to 22 crews depending on the amount of activity in the state.

The total amount billed to seismic companies in 1987 (January 1987 through December 1987) for agents fees was $465,120.00. The total amount collected for redline areas was $280,315.40. The total amount in Seismic collections for 1987 came to $745,435.40.

Shell Dredging

Throughout 1987 reports were received weekly and monthly from shell dredgers as required and on schedule. During 1987 the U.S. Corps of Engineers completed an environmental impact statement on shell dredging and several public hearings and meetings were held to receive comments. The draft EIS and final EIS was received and commented on by LDWF and the U.S. C.O.E. issued permits for dredging only portions of the coast in the fall. Other meetings were held between LDWF and shell dredgers to discuss dredging within an oyster seed ground and restrictions involved.

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WILDLIFE & FISHERIES
DEPARTMENT
LOUISIANA